THE IRON TRADE REVIEW

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Inquiries From Many Lands

For Iron and Steel Products, but Few Orders Have Been Booked on Account of War Uncertainties

Foreign inquiries, unprecedented as to the variety of iron and steel products desired and as to the number of countries wishing to place orders in the United States, are being received, and in some cases, including a sale of a fair tonnage of wire rods for delivery in England, orders have been booked, but for the most part, foreign business has not taken definite form on account of the uncertainties as to transportation and other complications connected with the prevailing war in Europe.

In the finished material market, the price situation is much more favorable for the sellers. Although the volume of new business is not large, there is very little dickering about quotations. Specifications are coming in much more freely.

Pig Iron

Although there is some increase in inquiry for pig iron in the east and fair activity in southern irons at Birmingham, the pig iron market continues to drag. Neither buyers nor sellers are anxious to make contracts for future delivery. The coke market is extremely dull and prices apparently weaker.

Ferro Manganese

The ferro-manganese situation is not so serious and shipments from England are expected to arrive within about three weeks. The usual quotation is now $100, tidewater. Prices of manganese ore have advanced rapidly. Consideration is being given to various deposits of manganese ore and manganiferous ore in different parts of the United States and Cuba, but opinions vary widely as to the extent to which these deposits can be utilized in making up the present shortage in ferro-manganese.

Tin Plate

Mills are urging large consumers of tin plate to specify and are giving notification that deliveries cannot be guaranteed unless specifications are promptly received. The result of the adoption of this policy has been very heavy specifying by the Standard Oil Co. and other large consumers. Foreign inquiries for tin plate include one for 2,000 boxes from India.

Structural Material

Owing to the conservative policy of the banks, many structural projects are being indefinitely postponed. Inquiries for shapes have been received from India, the Straits Settlement and Africa.

Sheets and Plates

There is very active buying of sheets in eastern territory and prices throughout the central west are firmer. Recent business includes considerable tonnage from Canada and the Pacific coast. There is better inquiry for plates in eastern territory.

Cast Iron Pipe

The outlook is that German pipe shops having contracts for large tonnages of cast iron pipe in South America will not be able to make deliveries and it is probable that considerable tonnage of this pipe will be made by plants of the United States. Such business will be welcome, as few orders have recently been placed from usual sources.

Warehouse Prices

Warehouse prices of iron and steel products have been advanced from $1 to $2 a ton in the Philadelphia district, in harmony with recent advances in mill prices. Quotations from store in other centers have not yet been changed.

THE OPEN HEARTH

Wanted—Sound Legislation, Not Makeshifts

THERE are an uncommon number of cooks at present stirring the broth of our merchant marine; and it is an old adage that too many cooks spoil the broth. We have not noted so far any great rush to transfer foreign-built ships to American register and it is our opinion that there will be no stampede in that direction. That privilege virtually has been extended to foreign-built tonnage during the past four years and no one has taken any advantage of it. The fact is that few will take advantage of the present measure, because the transfer has to be a genuine one and permanent in its character and no promise is held out that the onerous conditions under which American shipping operates on the high seas will ever be remedied. To be sure, the president is authorized in his discretion to waive the provision that the officers must hold American licenses, but that power will be exercised as a temporary emergency function. It was doubtless inserted in the bill in order that foreign-built ships, already owned by Americans, might be immediately transferred without change of personnel. The various labor organizations can be depended upon to make life miserable for congress over that very provision, and it is not likely that the president will exercise his authority in this respect until it is proved that no American officers are available.

What is really needed at this time is broad and far-sighted legislation establishing a base upon which the future structure of our merchant marine can be built. It was pointed out five or six years ago to congress that the sum of $5,000,000 annually could be judiciously expended in opening up mail routes to ports not usually reached and that gradually our ships might build up trade with these ports. Especial and particular emphasis was laid upon the trade with South America at that time by Secretary Root, of the war department, and if the policy then outlined had actually been put into effect, this country would not now be passing through this awful spasm to get its export trade moving. We would have had permanent connections with the continent south of us and we would have had something more to send through the Panama canal on Aug. 15, last, than a government-owned ship. This country is a protective country and for that reason it should extend protection to the American ship when it gets beyond the three-mile limit. It has imposed an artificial handicap upon the American ship and it should remove it by artificial means. There is a splendid opportunity at the present time to found an American merchant marine upon a permanent basis and congress will be unwise if it overlooks it.

The proposition just advanced to spend $25,000,000 to acquire government merchant men to engage in oversea trade is a mere makeshift. Great Britain, upon being sounded, has said that it would not object to the transfer of German ships to the American flag provided the transfer was bona fide and not merely for the period of the war. Now this proposition of government ownership of merchant ships will not bear analysis. It will work only at great cost to the people. A government-owned ship would not begin to carry cargoes as cheaply as a privately-owned ship. The Panama Railroad Steamship Line has been cited as an example of government operation. This line is run in conjunction with the Panama railroad and its financial statement usually shows a loss. Bookkeeping may figure in that, however. The operating expenses of the Panama railroad are twice that of the Pennsylvania railroad, and if the Pennsylvania railroad charged as much proportionately for carrying a ton of freight from New York to Chicago as the Panama railroad does from Colon to Panama, the rate of freight between New York and Chicago would be $33 a ton. Maintenance, depreciation and interest are meaningless terms in government operation. Granted that the government buys these ships and operates them to relieve the present congestion, what is to become of them when the war is over? It cannot continue to operate them as merchant ships, because the people of this country will not tolerate any such encroachment upon private enterprise. It cannot sell them, because

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that would be a violation of a solemn promise. As an alternative, it has been proposed that they be converted into transports.

Well, if we are in need of transports, why not do the very same thing that was done during the Spanish-American war? Buy the available ships of our coastwise fleet. They are good ships and can be adapted to eventual transport service at less expense than the floating palaces of the North German Lloyd and Hamburg-American lines. Moreover, their initial cost would be less; but what would be best of all would be the fact that our coast ship yards would receive such a flood of orders for new vessels to replace the old ones sold that it would give a great and immediate impetus to the iron trade.

Serving His Country

ONE of the finest examples that the American people have ever seen of the sacrifice of material interests in order to enter the service of the country has been furnished by Paul M. Warburg, who, although not required by law to do so, has announced that he will absolutely divest himself of all official connection with corporations in order that there may not be the slightest suspicion concerning any action that he may take while he is a member of the Federal Reserve Board. Mr. Warburg modestly admits that he is making a large sacrifice, but he does it cheerfully, because, he says, he sees a wonderful opportunity for bringing a great piece of constructive work into successful operation.

After all the newspaper talk about revelations that might be caused by Mr. Warburg's testimony before the Senate committee on banking, the only statement that he made to the committee which has attracted attention was that relating to the severing of his connections with the New York, Hamburg and other firms, of which he was an important factor. A man who makes such a sacrifice as that of Mr. Warburg is just as patriotic as the soldier who serves his country on the field of battle, and it is much more important to have men of the brains and ability of Mr. Warburg in the public service than it is for the country to have war heroes.

The State Police

THE announcement that certain labor agitators who profess to represent the solid labor vote of Pennsylvania have started a movement for the abolition of the state police of that commonwealth is not surprising. These men know that they cannot carry on their unlawful methods as long as the state police are in service. As the Pennsylvania Manufacturers' Association has pointed out, the state police have been and are efficient and unbiased. Class prejudices and class distinctions do not exist for them and they regard a law breaker as a law breaker, no matter to what social stratum he may belong. They are acknowledged to be the best trained, best desciplined body of patrolmen in America. They are a great blessing to the secluded farmers and the inadequately protected small towns and their abolition would be a triumph for lawlessness throughout the state.

When Unions Become Trusts

A READER of THE IRON TRADE REVIEW, referring to an editorial published in these columns in our issue of July 30, under the caption, "Proposed Exemption of the Labor Trust", says that strictly speaking, our argument that labor should be considered as a commodity and that legislation should be aimed to prevent monopoly of anything that can be used by a man for the oppression of his fellow men is sound. But our correspondent adds that this view is not in accord with the present general trend of thought, which considers the worker also from the humane and social point of view. In taking the position as stated in the editorial, we had no idea of advocating legislation which is not humane and does not give the best consideration to employes as social beings. We do not believe, however, that in order to pass humane laws it is necessary to confer special privileges upon the workingman and permit him, by joining a labor union, to make and enforce unjust demands upon employers. Labor unions are not necessarily trusts, but if they use their power to crush competition in the labor market and to establish a monopoly, they become trusts and should be prosecuted as such.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for August, 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for July, 1914.	Average for May, 1914.	Average for Aug., 1913.
Bessemer pig iron, Pittsburgh..	$14.90	$14.90	$14.90	$16.52
Basic pig iron, Pittsburgh.....	13.90	13.90	13.90	15.07
No. 2 Fdy. pig iron, Pittsburgh.	13.90	13.90	14.09	14.71
Northern No. 2 Fdy., Chgo....	14.00	14.00	14.25	15.00
Lake Superior Charcoal, Chgo..	16.00	15.75	15.75	15.00
Malleable Bessemer, Chicago...	14.00	14.00	14.25	15.00
Southern No. 2, Birmingham...	10.00	10.13	10.43	10.88
Southern Ohio No. 2, Ironton..	13.00	13.50	13.50	14.00
Basic, eastern Pa.....	14.00	14.00	14.00	15.00
No. 2X Virginia furnace.....	12.50	12.50	12.75	13.00
No. 2X Foundry, Philadelphia..	14.75	14.60	14.75	15.75
Ferro mang., Balti.....	100.00	37.50	38.50	56.00
Bessemer billets, Pbgh. & Ygn..	21.00	19.30	20.00	26.12
Op. h'th sh. bars, Pbgh. & Ygn.	22.00	20.20	21.00	27.12
Bess. sheet bars, Pbgh. & Ygn..	22.00	20.20	21.00	27.12
Op. h'th billets, Pbgh. & Ygn..	21.00	19.30	20.00	26.12
Steel bars, Pittsburgh.....	1.20	1.11	1.15	1.40
Iron bars, Philadelphia.....	1.25	1.17	1.20	1.37
Steel bars, Chicago.....	1.38	1.25	1.29	1.58
Tank plates, Chicago.....	1.38	1.28	1.29	1.63

	Today's prices.	Average for July, 1914.	Average for May, 1914.	Average for Aug., 1913.
Structural shapes, Chicago.....	$1.38	$1.28	$1.29	$1.63
Iron bars, Cleveland, local del'y.	1.20	1.20	1.20	1.50
Iron bars, Chgo. mill.....	1.07½	1.10	1.10	1.45
Beams, Pittsburgh	1.20	1.11	1.15	1.45
Beams, Philadelphia	1.30	1.25	1.25	1.55
Tank plates, Pittsburgh.....	1.20	1.11	1.12½	1.44
Tank plates, Philadelphia.....	1.30	1.25	1.25	1.55
Sheets, blk., No. 28, Pittsburgh.	1.95	1.80	1.87	2.20
Sheets, blue an., No. 10, Pbgh.	1.40	1.35	1.37	1.65
Sheets, galv., No. 28, Pbgh.....	2.90	2.75	2.80	3.25
Wire nails, Pittsburgh.....	1.60	1.51	1.57	1.66
Connellsville fur. coke, contr....	1.75	1.85	2.00	2.50
Connellsville fdy. coke contr....	2.35	2.40	2.50	3.00
Heavy melting steel, Pbgh.....	11.50	11.55	12.00	12.50
Heavy melting steel, east'n Pa..	11.00	10.50	10.75	11.50
Heavy melting steel, Chgo.....	9.50	9.75	9.94	10.50
Heavy cast, eastern Pa.....	12.25	12.00	12.50	13.25
No. 1 wrought, eastern Pa.....	12.50	12.25	12.50	14.25
No. 1 wrought, Chgo.....	8.50	9.00	8.63	10.50
Rerolling rails, Chgo.....	11.25	11.25	11.25	12.50
Car wheels, Chgo.....	10.75	11.00	11.38	12.50

(For Additional Prices See Page 404.)

Pig Iron Market Very Sluggish

Standard Sanitary Mfg. Co. Buys Additional Tonnage—Prices of Virginia Iron Irregular—Several Furnaces to be Blown In

New York, Aug. 25.—Negotiations for pig iron have been launched in increased volume in the metropolitan market during the past week and fully 10,000 to 12,000 tons now are up for figures. Much of this total or 7,000 to 8,000 tons of malleable and other grades for shipment this year is for a single equipment manufacturer who buys in this district for several plants, none of which, however, are located in this immediate territory. An eastern Pennsylvania pipe maker is figuring upon 2,000 to 3,000 tons of No. 2 plain for this year's shipment. Several other smaller lots are in the market. While the pending tonnage is better, there is nothing to indicate that buyers, on the whole, are inclined to cover ahead more freely, and the uncertainties of general business still dominate the situation. The furnaces also are showing no keenness for making sales at this time. Prices consequently are not readily defined. Southern makers, through local representatives, recently have added about 10,000 tons of foundry and basic to contracts with companies which cover in this district for outside plants. One lot of 6,000 tons was involved in these transactions. The inquiry for 1,000 tons of low phosphorus iron reported from Japan is for the Imperial Steel Works.

Eastern Traders Going Slowly

Philadelphia, Aug. 24.—Both the furnaces and the buyers continue largely to take a disinterested position as to immediate action regarding pig iron, and the market still is so meager in extent that prices may not be checked with certainty. The undertone of the situation undoubtedly is stronger, based upon the expectations of future improvement and occasional sales at advances are being made. Some makers are adopting very conservative policies in either quoting or selling, and are trying to discourage any speculative efforts on the part of consumers. Standard low phosphorus iron especially reflects firmness, and $21.50, Philadelphia, now represents the minimum figure. A sale of 1,500 tons of this grade delivered in eastern Pennsylvania over the remainder of the year was made at this figure. Lebanon low phosphorus is unchanged. Eastern low phosphorus makers are figuring upon the 1,000 tons of copper analysis iron inquired for by the Imperial Steel Works of Japan. Standard northern foundry holds firm at $14.75 to $15, Philadelphia, for No. 2X. The Bethlehem Steel Co. received a small tonnage for the Philadelphia navy yard at $14.75, delivered, for No. 2X, and $15.90, delivered, for No. 1, equivalent to $14.10 and $14.25, furnace. The Pennsylvania railroad is holding off action on its inquiry for 3,000 to 4,600 tons of coke and charcoal grades and may not buy at all. The Newport News Shipbuilding & Dry Dock Co. has inquired for 2,000 tons of ballast iron, but there is doubt at present whether this will be bought. The Southern Railway Co. asks 500 tons of 2 to 2.50 silicon and gray forge iron for September delivery at Lenoir City, Tenn. Virginia iron still shows a considerable price range, with $12.50, furnace for No. 2X the usual quotation, but $12.25 sometimes is done on especially prompt delivery. One of the Virginia pipe makers took 500 tons in the week and the Maryland Steel Co. was a small purchaser. The steamer Felix reached this port in the week with another cargo of Wabana, Nova Scotia, pig iron, about 3,000 tons, consigned to Delaware river pipe maker. One or two cargoes still remain to be delivered. The Thomas Iron Co. is preparing to blow in one of its Alburtis stacks.

Standard Buys More Foundry

Pittsburgh, Aug. 25.—The Standard Sanitary Mfg. Co. has been buying additional lots of foundry pig iron for third quarter delivery to plants at Allegheny and New Brighton, Pa., on

(*For complete prices see page* 404.)

the basis of about $13, valley, at which figure the company purchased 6,000 tons a few weeks ago. The Standard interest also has obtained additional southern foundry iron, on the basis of $10, Birmingham, for No. 2, but the transaction was consummated before the market in the south started to reflect strength. Except for part played by the leading manufacturer of sanitary ware in this district, the pig iron market has been almost at a standstill, it being apparent that the European war and its influences upon the financial situation, has resulted in the adoption of extremely conservative policies. Cherry Valley Furnace, at Leetonia, O., which blew out for necessary repairs two months ago, is scheduled to resume operations at an early date, and it is probable that Midland furnace, at Midland, Pa., will go in early next month. The latter stack was enlarged and relined. One of the two Dunbar furnaces, Dunbar, Pa., will go on ferromanganese, Oct. 1.

Demand Dwindles

Cincinnati, Aug. 25.—Demand has dwindled down to almost a minimum and sales are usually for extremely small lots for nearby shipment. The pig iron market presents a sharp contrast with the market for some finished materials, as these latter, such as sheets and plates, are beginning to show more life and strength. Southern Ohio malleable iron has dropped 50 cents a ton during the week and both this grade and No. 2 foundry can now be had at $13, Ironton basis, for either prompt or contract shipment. Basic iron is a little uncertain, as there has been no demand for it. The Columbus Malleable Iron Co., Columbus, O. and the American Malleable Iron Co., at Marion, O., are each asking for 500 tons of malleable iron for last half delivery. These are the only inquiries of importance before local dealers.

Tennessee iron is ranging in price all the way from $10 to $10.75, Birmingham basis, for No. 2 foundry, while the prevailing prices in Alabama are from $10 to $10.25, Birmingham basis, for this same grade. Iron obtainable at $10 is more scarce than at $10.25, but the former price can easily be done on acceptable business.

Shipping Heavy at Buffalo

Buffalo, Aug. 25.—Heavy shipments of iron under contract, firmer prices, limited sales and little inquiry characterize the Buffalo market at the present time. All of the stacks in the territory are forwarding considerable quantities of pig under contract. One interest on a single day during the present week sent out 50 large cars, but little or no new business is being booked. Prices are as follows: No. 1 foundry, $13.25 to $13.75; No. 2X, $13 to $13.50; No. 2 plain, $12.75 to $13.25; No. 3 foundry, $12.75 to $13.25; gray forge, $13 to $13.25; malleable, $13 to $13.50; basic, $14 to $14.25. Some grades of charcoal iron, regular analysis, have advanced 50 cents and are now $16.25 to $17.25, while the special brands and analysis are being quoted at $20.50.

Northern Quiet at Chicago

Chicago, Aug. 25.—Sellers of northern pig iron find conditions unusually quiet with almost no inquiry and sales of only small tonnages. Little temptation exists to shade prevailing quotations of $14, Chicago furnace, for No. 2 foundry and malleable, but it is believed some sales have been made at a lower figure, especially in competition with southern iron in competitive territory.

The feature of the market at present is the fact that southern iron is being held more stiffly and the quotation of $10, Birmingham, for No. 2 foundry has practically disappeared. It develops that within the past fortnight southern furnaces have booked considerable tonnages for the remainder of this year on a basis of $10, Birmingham, and feel their position is sufficiently firm to advance the quotation to $10.25, Birmingham.

A factor which aided in disposing of the large tonnage believed to have been sold in the north is the expectation that the new reduced freight rate from Birmingham north will be in effect during most of the last quarter. This has had the effect of reducing the probable delivered cost by 35 cents per ton.

During the prevalence of the $10, Birmingham, quotation some brands of iron which seldom sell as low as other southern brands participated in the selling at the minimum level.

Southern Iron Active

Birmingham, Ala., Aug. 24.—Activity in the southern pig iron market continues with No. 2 southern selling at $10.25 for immediate shipment and $10.50 for fourth quarter delivery. Forecasts are that first quarter for the new year will see iron at $11.

The company that for the past several weeks has been selling at $10 is believed to have withdrawn this quotation, no sales at that figure being reported last week. One company reported the sale of 70,000 tons in "the last few weeks" and another reports the sale of 55,000 tons since Aug. 1. Inquiry is stronger than last week and good prospects are in store for the near future. The effect of the war, local iron men believe, will soon be felt, although they state they do not believe the present improvement in conditions is due directly to that cause.

Only Small Lots

St. Louis, Aug. 24.—Inquiry for pig iron in the St. Louis market is confined to 50 and 100-ton lots, but the demand for spiegeleisen, owing to the scarcity of ferro-manganese, has been strong, and about 1,000 of the 30,000 tons said to have been sold over the United States was placed here. The price is reported to have been $31.50 at shipping points.

Southern No. 2 is quoted at $10.50, Birmingham. Northern iron, which is very little in demand, is held at $13.50, Ironton, and $14, Chicago.

Little Buying

Cleveland, Aug. 25.—The persistent sluggishness of the pig iron market continues and both buyers and sellers are reluctant about entering into contracts when the future seems so uncertain. The melt is apparently being maintained as well as it has for several months and deliveries are moving forward fairly well.

(*For complete prices see page* 404.)

Pig Tin Prices

Have Declined—No Tin Plate Mills Compelled to Close

Pittsburgh, Aug. 25.—Block tin quotations, in the last week or 10 days, have dropped from 65c to 41c a pound, and the market is not nearly so excited as a fortnight ago when an acute famine was feared. Many dealers are not offering material, believing quotations soon will creep back to their high levels. The market for tin plate continues almost entirely nominal, and reports of sales all the way from $3.50 to $3.75 per base box are heard. So far as can be learned, no mills in the immediate district have had to close for lack of pig tin, but it is known that mill managers are exercising strict economic principles.

Small Inquiries in East

Philadelphia, Aug. 25.—There is some inquiry for relatively small quantities of tin plate in the eastern market, including one lot of about 5,000 boxes. Some of the larger makers have been quoting $3.60, Pittsburgh, per base box, on this business and have been following the policy of putting out new propositions cautiously, as their capacity is heavily sold and they are anticipating a large pack this season by the canners.

Ferro Situation Not So Feverish

Shipments From England Expected to Start This Week—Much Higher Prices for Manganese Ore—Corporation's New Schedule

New York, Aug. 25.—First shipments of English ferro-manganese against current contracts under the condition of the buyer assuming war risks and freight extras are expected to reach this country around Sept. 15 to 20, or shortly thereafter. While no formal advices of sailings have been received, it is expected that these will start forward during the present week. Announcement of the intended resumption of shipments against contract, together with the fact that English sellers are offering additional tonnage for delivery late in September or early October, has tended, temporarily at least, to quiet the feverish condition in the market. The spot market has shown less activity in the week, but some further sales were put through. A sale of 100 tons for early delivery was done at $110, seaboard, and another of 100 tons brought a higher figure. Some resale material is being offered by consumers with surplus supplies, but in some cases, the prices asked have been so high as to repel interest of buyers. The additional sales of ferro-manganese made by English sellers to come forward with resumption of contract shipments and in 30 to 45 days have reached fully 2,000 tons. As stated, this business has been made upon the basis of $100, seaboard, and more material for such delivery is offered at this figure. This additional tonnage, it is believed, will be furnished from the surplus stocks of ore or finished ferro-manganese now on hand with English makers. It also is reported that the availability of this tonnage is due to the diversion to England of ore or finished ferro originally consigned to other countries. Ground ferro-manganese continues to be held at 7 cents per unit, at eastern Pennsylvania grinding plants.

Manganese Ore Advances Sharply

New York, Aug. 25.—A sharp advance in the price of manganese ore in this country is shown by some transactions just closed. The Pennsylvania Steel Co. and the Cambria Steel Co. have been buyers of two or more cargoes of Brazilian and Russian ore, the latter having been diverted to this country while afloat. For the Russian ore, about 26 cents per unit of manganese, tidewater, was paid, and it is reported that 35 cents per unit, tidewater, was obtained by sellers on the Brazilian ore. These prices compare with about 18 cents per unit, tidewater, the level prevailing before the outbreak of the war which shut off the Russian supply and obstructed that in India. About 15,000 to 20,000 tons of ore are involved in these sales, and it is understood the purchasers do not contemplate the immediate consumption of this material in the manufacture of either ferro-manganese or spiegeleisen, but intend to reserve it as a protection against future contingencies.

The Steel Corporation, the principal buyer of manganese ore in this country, has issued a new schedule on domestic manganese ore, offering 26 cents per unit delivered at Pittsburgh or Chicago for ore containing 49 per cent and over; 25 cents for 46 to 49 per cent; 24 cents for 43 to 46 per cent, and 23 cents for 40 to 43 per cent. As previously reported, the Steel Corporation has made arrangements to bring in an increased tonnage of Brazilian ore.

Some further lots of Russian ore which had been located afloat were offered in this city today.

Watching Magnesite Situation.

New York, Aug. 25.—Some steel makers are beginning to show apprehension over their requirements of magnesite for open-hearth furnaces, the stocks of which are said to be rather light among both sellers and consumers in this country. Much of this material is obtained from Austria and the shipments from that source now are suspended.

Plan of Tennessee Company

Birmingham, Ala., Aug. 24.—Announcement is made that ferro-manganese iron will be made by the Tennessee Coal, Iron & Railroad Co. at one of its Bessemer furnaces. The company has been making this alloy at one of the Ensley division of blast furnaces, but the entire division is now making pig iron, it is stated, and therefore what is known as the Robertson furnace has been blown in to make ferro. In this way the Tennessee company states it will not be affected by the high price of ferro-manganese caused by the European war.

Not So High

Pittsburgh, Aug. 25.—The ferro-manganese situation has not appeared so acute the last few days, and prices have dropped back to a basis of about $100 a ton at the eastern seaboard, but consumers in this district will not be content to rest on their oars until it is absolutely certain that tonnages can be obtained without difficulty. The rapidly increasing magnitude of the complicated situation abroad has made it impossible to forecast the trend of events the next few weeks. Representatives of the American Manganese Mfg. Co., Philadelphia, which controls the Dunbar Furnace Co. plant at Dunbar, Pa., continue to offer alloy, ranging from 35 to 40 per cent in manganese, as was mentioned in last week's issue of THE IRON TRADE REVIEW. Reports again came out last week to the effect that ferro-manganese had been placed on the embargo list, but these rumors are unfounded.

Consider Merchant Production

New York, Aug. 25.—Some further proposals looking toward the manufacture of merchant ferro-manganese and spiegeleisen in this country, other than that of the American Manganese Co. at Dunbar, Pa., are under consideration at the present time. If some of the several plans now in view materialize, it is expected that manufacturing of ferro-manganese may be taken up in the east and foreign ore will be used. Other plans contemplate the making of spiegeleisen with domestic manganiferous ores.

The manganese ore situation resulting from the blocking of Russian and Indian supplies for this country is causing renewed attention to be given to the manganese ore deposits in Cuba. The ore beds of that island, it is said, if properly worked, will yield an important tonnage of this character. Several projects which are aimed at the marketing of this ore now are being matured.

Many Minor Consumers

Cleveland, Aug. 25.—Dealers in ferro-manganese are surprised by the number of inquiries which they are receiving from foundrymen, some of whom were not generally known as consumers of this alloy. Sales of small tonnages have been made on a basis of $115, Baltimore. Negotiations are pending for some lots of less than a ton.

(For complete prices see page 404.)

More Sheet Activity

Brisk Buying in Some Centers and Increased Firmness of Prices in General

Pittsburgh, Aug. 25.—Manufacturers of steel sheets in western Pennsylvania and eastern Ohio are well satisfied with the recuperative ability reflected by the market the last three weeks. Prices have advanced rather sharply and specifications against contracts have come out in fairly heavy volume, some makers describing the last three weeks as the most active in more than a year. Some mills are offering black and galvanized products at 2c and 3c, respectively, for fourth quarter delivery, although those figures are being shaded for immediate shipment. New selling has not been heavy; this may be attributed to the attitude of more important mills in not attempting to take additional contracts for future shipment.

Sheets Brisk in East

Philadelphia, Aug. 24.—Brisk buying of blue annealed sheets from makers in eastern Pennsylvania is being maintained. A number of orders were taken in the week by these mills for early delivery at their newly advanced level of 1.65c, Philadelphia, or 1.50c, Pittsburgh, for No. 10 gage blue annealed. Specifications against former contracts also remain active, some of these being from the Pacific coast, where buyers recently covered on their requirements with eastern makers at $3 a ton advance over the price, made necessary to meet foreign competition. Eastern Pennsylvania mills are more reluctant to contract for future delivery under present conditions. They have been receiving increased inquiry from Canada, where foreign makers, especially German, formerly operated to advantage.

Advances Holding

Chicago, Aug. 25.—Further advance in the price of steel sheets has been held firmly and No. 28 gage black and galvanized are now held at 2.18c, and 3.18c, Chicago mill. Blue annealed are firm at 1.63c, Chicago. These prices, represent an advance of $6 per ton within the last three weeks, when the movement upward from prevailing low levels was started. Mills in this district have tonnage sufficient to run them well into fourth quarter and, as a rule, delivery is not promised under six weeks. Much of the tonnage now being shipped was taken at considerably lower prices and specifications are coming out in good volume. The disposition of all makers of sheets seems to be to hold to present quotations and shading is not being heard.

While contracts for fourth quarter are not being made, specifications placed now will not be delivered until fourth quarter is opened and this fact practically makes the price for the final quarter of the year.

However, makers expect another advance will be registered before the beginning of that period and the firmness of the present market indicates considerably higher prices within a few weeks.

Market Good at Cincinnati

Cincinnati, Aug. 24.—Business in sheets continues good, both on new orders and specifications on contracts. The mills are refusing to accept business beyond Oct. 1, and are holding firm at 2.15c on black sheets No. 28 gage, 3.15c on galvanized No. 28 gage, and 1.60c on blue annealed No. 10 gage, all Cincinnati basis. From all appearances, dealers are very low in stocks and are in a hurry to replenish them as another advance in price is expected by fall, if the European war continues to shorten the supply of ferro-manganese and tin.

Sheet Prices Firm

Cleveland, Aug. 25.—Prices in the sheet market are showing considerable stability, the usual quotations being 1.95c, Pittsburgh or Youngstown, on No. 28 black, 2.90c on No. 28 galvanized and 1.45c on No. 10 blue annealed. The tendency is toward still higher prices and when a quotation is made it is usually for not more than 24 hours.

Bar Buyers Specifying

Against Their Contracts—Some Railroads Ordering in Material Freely

Philadelphia, Aug. 24.—Consumers of steel bars in this district are specifying liberally against their 1.15c, Pittsburgh, contracts and appear to be giving more attention towards putting themselves in better position upon their stocks. Some of the railroads continue to order in material very freely. In one case a system is anticipating its regular monthly quotas and now is asking October tonnage for September delivery. New business is small. Makers without exception are holding to 1.35c, Philadelphia, or 1.20c, Pittsburgh, on new business. Irregularity still marks the shafting market. While some makers report having advanced to 66 off, a contract for about 50 tons was placed in the week at better terms.

Steel Bars Steady

Chicago, Aug. 25.—Recent advances in the price of steel bars have held firmly and no disposition is manifested on the part of anyone to sell at less than 1.38c, Chicago. While new business is comparatively light and mills are not making contracts unless accompanied by specifications, the tonnage on specification is increasing as holders of contracts made at lower prices see the advantage of taking out their material during the life of the contract. General shortening of business under uncertainty of the war and financial accommodations seems to have lessened somewhat and immediate needs of consumers are being filled conservatively. Mill books are showing somewhat increased tonnage and in the case of one eastern concern represented here, no deliveries are promised under three to four weeks. This same interest has withdrawn its steel stock list and is using its accumulation to expedite filling of orders already on the books.

There is expectation in some quarters of another increase in prices on finished steel within a short time and while 1.43c, Chicago, is quoted tentatively for fourth quarter, it is expected this price will be established before Oct. 1. In fact, makers of steel are becoming so sanguine of higher prices that 1.68c, Chicago, is predicted by the end of the year.

Although some contracts have been made running into fourth quarter at 1.38c, Chicago, there is not much demand for forward contracts and makers are backward about accepting tonnages beyond the next five weeks. Some small tonnages have been booked at 1.43c, Chicago, for fourth quarter, but the total is inconsiderable.

Carnegie Takes Contract

Cleveland, Aug. 25.—The quotation of 1.20c, Pittsburgh, for steel bars, is being firmly adhered to and specifications

(*For complete prices see page* 404.)

have been satisfactory. New business, however, is of moderate volume. The principal transaction was the placing of 2,100 tons of reinforcing bars with the Carnegie Steel Co. by the Crowell-Lundoff-Little Co. for use in the construction of the Bingham warehouse.

Bars, Shapes and Plates

Buffalo, Aug. 25.—Prices are being firmly held at 1.20c, Pittsburgh. Some small lots for prompt shipment have been placed at 1.25c. There is a disposition on the part of some of the smelting agencies and mills to limit quotations to established customers on account of the ferro-manganese situation. They say they have enough of the alloy to possibly meet the demands of their furnaces up to the first of the year, at the present rate of production, but the supply beyond that time is a problem remaining to be worked out.

Heavy Specifying

New York, Aug. 25.—Specifying of consumers in this district against steel bar contracts is satisfactory to the mills. Consumers now are filing requisitions for material in a way that indicates that they are putting themselves in a more comfortable position on their stocks although no heavy accumulations are being provided for. New business is on a rather small scale, but 1.36c, New York, or 1.20c, Pittsburgh, is quoted firmly.

Iron Bars Firm

Chicago, Aug. 25.—The situation in iron bars continues to show strength and while prices have not advanced in the past week, they have grown considerably firmer. Quotations are still on a basis of 1.07½c to 1.12½c, Chicago mill, with the bulk of business going at 1.10c and unusually desirable specifications being necessary to command the minimum. A large interest here is operating its mill at about 90 per cent capacity and while no rush of orders is being received, tonnage is sufficient to maintain a steady operation. It is not believed the minimum of 1.07½c, Chicago, is being shaded, as demand is comparatively light and composed of small orders which give little temptation to any maker to quote a lower price.

Hoops, Bands, Shafting, Ties

Pittsburgh, Aug. 25.—The market for hoops, bands, cotton ties and cold rolled shafting is quiet, and no new developments are expected until general conditions are more normal. Specifications have come out in fairly good volume but new orders have been light.

Building Plans Delayed

On Account of Financial Conditions—Inquiries for Shapes From Numerous Foreign Lands

Pittsburgh, Aug. 25.—Uncertainty caused by the war raging in Europe, which still threatens the equilibrium of our money market, has resulted in the postponement of numerous structural undertakings in this and other districts. Fabricators do not expect to enjoy activity until the future is more certain. Structural shapes are being held at 1.20c in this district, and no reports of shading have been heard. There has been some demand for structural material for foreign shipment, but makers are unwilling, at present, to quote prices.

Mill Orders Are Good

Philadelphia, Aug. 24.—Against the orders they have recently booked at prices below the present market, eastern Pennsylvania structural shape mills now are receiving very satisfactory requisitions and outputs are more favorable. The volume of new business, however, is limited and the outgoing tonnage is not being replaced. As indicated by the restricted present buying, 1.35c, Philadelphia, or 1.20c, Pittsburgh, is being uniformly quoted. Fabricated offerings in this district are not heavy, but the Baltimore & Ohio railroad in the week put out an 8,000-ton bridge for western Pennsylvania delivery, making about 12,000 tons of bridge steel now up for figures in this district.

Projects Postponed

Cleveland, Aug. 25.—Financial considerations are having influence in causing the delay of some projects. It is announced that the erection of a 12-story building in Akron has been indefinitely postponed for this reason. There is no prospect of any large tonnages being placed in the immediate future in this territory.

Plates and Shapes Firm

Cincinnati, Aug. 24.—The market on plates and shapes is firm at from 1.35c to 1.40c, Cincinnati basis, and makers in this territory have been doing a fair business during the past week. Specifications on old orders are heavier than at this time last month, and the tonnage of new business booked during August will be considerably above that for July, especially when the last two weeks of these months are compared.

Projects Are Small

Chicago Aug. 25.—Structural lettings continue to be in moderate tonnages and those closed during the past week for the most part have not exceeded 500 tons each.

Prices on structural shapes are firm at 1.38c Chicago and fair business is being done in specifications on existing orders.

Inquiries From Abroad

New York, Aug. 25.—Export inquiries for plain material have been coming to domestic mills through this district, some of them for good size. Among these have been requests for prices from India, Straits Settlement and South Africa. Very little inquiry is coming from Canada, as conditions there are reported to be very much depressed at present. Some of the leading bridge shops of the Dominion have been shut down and numerous suspensions and cancellations have been received. The structural steel market at New York and vicinity, while a little broader, is by no means active and the progress of plans still is retarded by financial conditions. New inquiry is much below normal. Prices appear to be firmly held at 1.36c, New York, or 1.20c, Pittsburgh.

CONTRACTS AWARDED.

Underframes for cars for Chicago Surface Lines, 574 tons, to the J. G. Brill Co.

City of Chicago, machine shop for Marshall Blvd., municipal plant, 535 tons, to the Modern Steel Structural Co.

Northern Pacific Ry. Co., various bridges, 322 tons.

Pavillion building, San Francisco, Cal., 252 tons, to the Golden Gate Iron Works.

Colfax-Larimer viaduct, steel forms, Denver, Col., 250 tons, to the Vulcan Sheet Metal Co.

One 288 foot highway span, Franklin, Wash., 230 tons, to Minneapolis Steel & Machinery Co.

Power house, Ford Motor Co., Detroit, 2,400 tons, awarded Whitehead & Kales, Detroit.

Steel sheet piling, 250 tons, for substructure work on Pennsylvania railroad bridge at Kiskimenitas Junction, Pa., awarded to the Jones & Laughlin Steel Co.

Warehouse for Ford Motor Car Co., Brooklyn, 650 tons, awarded Geo. A. Just Co. and plain material to be furnished by Bethlehem Steel Co.

Power house, Pawtucket, R. I., 250 tons, awarded Providence Steel & Iron Co.

Building for New England Gas & Coke Co., Everett, Mass., 300 tons, awarded New England Structural Co.

Buildings for estate of C. K. G. Billings on

(*For complete prices see page* 404.)

Long Island, 400 tons, awarded American Bridge Co.

CONTRACTS PENDING.

Bids on Hamilton county court house, Cincinnati, involving 4,300 tons, indefinitely postponed by county commissioners.

Bridge construction over Allegheny river near Pittsburgh for Baltimore & Ohio railroad, about 8,000 tons; bids to be received Sept. 14.

Connelly office building, Atlanta, Ga., 800 to 900 tons; revised bids being taken.

Bridge work for Pennsylvania railroad 350 tons, including overhead work at Johnstown, Pa., and structure at Baltimore; bids being taken.

Smoke-gathering plant for Pennsylvania railroad, Ninth and Green streets, Philadelphia, 150 tons; bids being taken.

Section No. 3 of the Broadway-Fourth avenue subway extensions, Manhattan and Brooklyn, 4,500 tons; Flynn & O'Rourke Co., Inc., lowest bidder on general contract.

Hamilton County Court House, Cincinnati, O., 3,000 to 4,000 tons, contract held up because of effect of prevailing financial conditions upon contemplated bond issues.

Highway bridge over the Hudson river at Troy, N. Y., 1,500 tons, bids being taken.

Passenger station at Hartford, Conn., for the New York, New Haven & Hartford railroad, 500 tons; general contract awarded P. J. Carlin.

Subway section at William street, Manhattan, 3,000 tons. Bids to be taken Sept. 15.

Plates Improve in East

One Company Will Produce About 90 Per Cent of Capacity this Month

Philadelphia, Aug. 24.—Plate tonnage with eastern mills continues to make a better showing and one important maker reports its output this month will be about 90 per cent of capacity. Mill orders of a miscellaneous character constitute most of this tonnage, and where such new business is being booked it is on the basis of 1.35c, Philadelphia, or 1.20c, Pittsburgh. A desirable order for immediate rolling, however, still brings out 1.30c, Philadelphia, or 1.15c, Pittsburgh, and some quotations of this level were made in the week. Some contracts have been taken for fourth quarter delivery at 1.40c, Philadelphia, or 1.25c, Pittsburgh. Inquiry for plates with eastern Pennsylvania makers is better and some sizeable orders were under negotiation this week, including 5,000 tons of car plates for immediate delivery to an eastern Pennsylvania builder; 2,500 tons for a Baltimore & Ohio railroad bridge over the Allegheny river; 2,000 tons for prospective marine work, and 1,000 tons for a western Pennsylvania tank builder. In some of these cases, the buyers sought 1.10c, Pittsburgh, unsuccessfully, but some of them received 1.15c where quick delivery was stipulated.

Foreigners Still Inquire

Pittsburgh, Aug. 25.—Inquiries continue to be received by domestic brokers and foreign consumers for tonnages of finished and semi-finished steel products for shipment to England, Scotland, Norway, Sweden, Denmark, Australia, South America and other foreign countries, as a result of the prostrate conditions of industries in Belgium and Germany, which had taken contracts to fill the tonnages involved. One inquiry involves 5,000 tons of skelp for shipment direct to England, and a leading manufacturer reports that yesterday's mail alone contained inquiries for 10,000 tons of miscellaneous material for foreign shipment. Mill managers, unable to arrive at satisfactory conclusions as to the future, are hesitating about naming prices for foreign shipment. A prominent steel company official expresses the belief that it will be 60 days or more before effects of the war can be determined.

Holding Position

Chicago, Aug. 25.—Steel plates show no change from their former position and are firm at 1.38c, Chicago, with some interests holding the lighter gages at 1.43c, Chicago.

Absence of railway car buying is having its effect on this product and while it has not led to weakness, it has deprived the plate market of some strength it otherwise would have manifested.

Wire Advance

Adopted by All Makers—Specifications Increase

Pittsburgh, Aug. 25.—All makers of wire products now are quoting on the basis of $1.60 per keg for nails to jobbers, the quotation announced Aug. 17 by the Youngstown Sheet & Tube Co., and subsequently adopted by the Pittsburgh Steel Co., the Cambria Steel Co., the American Steel & Wire Co. and the Jones & Laughlin Steel Co. The last two companies did not withdraw quotations $1 a ton under the $1.60 level until the latter part of last week. Specifications against contracts placed at $1.50 and $1.55, as the base price of nails, have been coming out in satisfactory volume, but there has been no selling at advanced prices. Mill operations have been increased slightly in this district.

(*For complete prices see page* 404.)

Wire Specifications Stimulated

New York Aug. 25.—Specifications for wire products have been stimulated by the recent advances of prices in eastern and other districts. There also is a fair amount of new buying for this season, some of it at the higher prices. The American Steel & Wire Co. put into effect, Aug. 20, its advance of $1 a ton, following similar action by independent companies several days earlier. The leading interest now is quoting 1.60c, Pittsburgh, on wire nails, 1.40c on plain wire and $26, Pittsburgh, on wire rods. An advance of one-half point in the discounts on wire fencing also was announced.

All Advance Wire

Chicago, Aug. 25.—Following the announcement by several independent makers of wire and nails of an advance of $1 per ton, the leading interest, after several days, announced a new schedule with the same advance, making quotations 1.60c for nails and 1.40c on plain wire. Fencing wire was advanced one-half point.

The withdrawal of quotations and making of new prices were somewhat irregular in this instance, starting with several independents and being followed by others and then by the leading interest with a large independent maker bringing up the rear. The advance has had the effect of increasing specifications on contracts taken at lower prices and considerable tonnage is being accumulated.

Cancelling Tonnages

Cleveland, Aug. 25.—The wire market is firm, following the recent advance, and mills are cancelling unspecified tonnages with unusual promptness.

Prices Maintained

Buffalo, Aug. 25.—The principal interest has followed the lead of the independents in the Buffalo district by advancing the prices on wire from 1.35c to 1.40c and on wire nails to 1.60c. The new prices are being firmly held. Activity on the part of the cooperage trade has caused a marked demand for hoops. In all of the wire and wire product lines the demand is strong and the general inquiry seems to be, "How soon can you ship?"

Superintendents of the Upper and Lower mills of the Carnegie Steel Co., at Youngstown, held a picnic at Anderson's grove, west of Austintown, Aug. 22.

Billet Inquiry Active

Foreign Buyers Seeking American Steel—Higher Quotations at Youngstown and Pittsburgh

Philadelphia, Aug. 24.—Further inquiry from foreign buyers for both billets and sheet bars have been received by eastern Pennsylvania steel makers in the week. The sheet bar demand all has been from the British Isles. Some quotations are being made, but owing to the fact that these inquiries are largely preliminary in character and to the prevailing uncertainties, no actual business for eastern mills yet has resulted. Eastern manufacturers of finished goods also are putting out some inquiries for billets to cover the finished product asked by them by foreign buyers. One instance of this kind involves 2,500 tons. There is more domestic demand for billets in the east. The eastern market on rolling billets is quoted at $22.40 to $23.40, Philadelphia, or $20 to $21, Pittsburgh.

Advanced Prices Are Holding

Ashland, Ky., Aug. 24.—Billets are holding at $20.50, and wire rods at $25.50, both Ashland basis, these prices having been advanced 50c per ton last week. The market could still be said to be slow, but it shows a slight improvement over that of last week, and business done during the past few days has been much in excess of that for the corresponding period last month.

Prices Stiffen at Pittsburgh

Pittsburgh, Aug. 25.—Makers of billets, sheet bars and wire rods in this territory have withdrawn quotations prevailing a week ago and are asking about $1 a ton above previously prevailing levels. Billets and sheet bars are being held on the basis of $21 for the former and $22 for the latter, both at Pittsburgh and Youngstown, and leading manufacturers, including the Carnegie Steel Co., the Republic Iron & Steel Co. and the Youngstown Sheet & Tube Co., do not appear anxious to sell at those quotations. There have been few sales this week, but it is reported by a reliable source that tonnage already has commanded advanced quotations. Demand for semi-finished steel products, including billets, sheet bars and wire rods, for shipment to foreign countries, has been heavy, and some wire rods already have been sold for delivery to England. Rods have responded to the recent advances for finished wire products, now being held at $26, Pittsburgh.

Coke Drags

Appears Weaker — Very Few Transactions Are Reported

Pittsburgh, Aug. 25. — Standard grades of Connellsville coke continue to occupy a position in the rear rank of the iron and steel market, reflecting no life and appearing weaker than a fortnight ago. Blast furnace owners, most of whom are under cover, show no interest in fuel requirements, and operators are not attempting to push sales. Furnace coke is hovering around $1.75, ovens, with some dealers asking 10 and 25 cents above that price for contract delivery. Foundry grades have reflected further weakness the last few days, both for spot and future shipment. The *Connellsville Courier*, for the week ending Aug. 15, says production in the upper and lower regions was 257,340 tons, a decrease of 4,730 tons compared with the week before.

No St. Louis Demand

St. Louis, Aug. 24.—There is virtually no demand for coke in the St. Louis territory. Furnace grades are quoted at $2.50 to $2.75, ovens.

Dull at Cincinnati

Cincinnati, Aug. 25.—The coke market is very quiet and very little fuel is either being sold or shipped. Operators are looking for much better business in the fall, as numerous users have been buying from hand to mouth for several months in order to take advantage of concessions made for spot shipment coke, and it is expected that as soon as the market shows any improvement, they will contract for several months ahead. No changes in prices are reported.

Undelivered Cast Pipe

Sold by German Makers may be Transferred to United States Plants

New York, Aug. 25.—Some importers of German manufactures have begun to sound out eastern cast iron pipe makers with respect to the latter replacing tonnage now cut off from abroad, on contracts being carried forward by these interests. These matters as yet only have taken preliminary form. It is believed German makers who have under contract considerable tonnage for South American delivery, including notably orders taken early in the year for the Buenos Aires, Argentine, waterworks, may be obliged to transfer this business to this country. Further, it is believed American makers have a good chance to capture remaining pipe requirements for large public works now going forward. Buenos Aires, which set out two years ago to buy 50,000 tons annually for five years, still has three years of this requirement to place. Domestic conditions in pipe in the east are quiet. A requirement of 970 tons of 4's to 14's for Riverhead, Long Island, is up for disposition this week. Eastern pipe prices do not improve.

Cast Pipe Quiet

Chicago, Aug. 25.—No features have appeared in the market for cast iron pipe and last week was devoid of any important lettings. No award has been made on 5,700 tons at Toledo, O., on which bids were opened some time ago as financing has not been completed.

Bids will be opened Sept. 2 at Springfield, O., for 100 tons, and Kansas City, Mo., on the same day for 1,200 tons. Highland Park, Mich., will open bids Aug. 29 on 600 tons of pipe for an intake. Routine and contractors' business has been good and has kept up foundry activity in the absence of large contracts.

(*For complete prices see page* 404.)

Tubular Goods Quiet

Pittsburgh, Aug. 25.—The market of iron and steel pipe and boiler tubes has been marking time since the outbreak of hostilities abroad a little more than three weeks ago. There have been no sales of consequence in the open market, and no new inquiries of importance are before the trade. The market for boiler tubes continues quiet and prices have not reflected any strength.

The Republic Iron & Steel Co., Youngstown, is operating almost at full capacity. Except for one blast furnace at Youngstown, all departments of the company are in operation.

Scrap Advances Hold

In Eastern Territory, but Improvement is not Regular or General

Philadelphia, Aug. 24.—Recent firming up of some grades of scrap in the eastern Pennsylvania market is more than holding its own and more stability generally is shown. Heavy melting steel now clearly is at a minimum of $10.50, delivered, with $11, paid, as recently noted, at certain points. Some dealers declare they will not sell under $11, delivered, at any destination. One of the works which buys closest, however, in the week bought several thousand tons at $10.50, delivered. Another large eastern works which is not a regular buyer of steel also is in the market at $10.50, delivered. Low phosphorus is higher, a sale of 1,000 tons of crop ends off in sulphur at $14.50, delivered, being noted. Steel axles in lots of 100 tons have been selling at $14.50, delivered. Wrought pipe is up, some makers offering $10.50, delivered. Trading remains moderate, though better than it was.

Very Little Business

St. Louis, Aug. 24.—Dealers in scrap iron continue to play a watchful waiting game in the St. Louis territory, believing that prices will advance in the near future. Very little business is being done, and prices are unchanged. The Missouri, Kansas & Texas railroad is out with a list today for 1,000 tons.

Continues Dull

Cincinnati, Aug. 24.—Demand for iron and steel scrap continues at a minimum and the market is at a standstill. Foundries are buying slowly and carefully, and mostly in small lots, even when good concessions are offered. Rolling mills, which are the largest users of scrap in this territory, are showing no disposition to buy, as they have a large surplus on hand and it will take considerable time before they can be used up. Prices are unchanged from those that have held for several months.

Scrap Prices Soft

Chicago, Aug. 25.—Scrap prices are exceedingly soft. Almost all dealers have long stocks of material bought at prices considerably higher than those ruling at present and are not seeking to sell. Incidentally, the small demand which exists meets strenuous effort on the part of sellers to obtain as high prices as possible to minimize their inevitable loss. Present levels are almost a record for this market and quotations are almost nominal as comparatively small tonnage is changing hands. Demand from consumers is light and offers have been comparatively heavy up to this time.

Railroads this week are offering less than usual and only two small lists are before the trade. The Grand Trunk railroad offers 427 tons and the Standard Oil railroad department 280 tons.

Prices are Firm

Buffalo, Aug. 25.—Prices remain firm. Dealers believe that prices, if changed at all in the near future, will be upward rather than downward. There is not much trading being done. Consumers seem to be uncertain what course to follow on account of the war situation. The only break during the week has been a slight softening in prices of No. 1 railroad cast, now quoted at $10.25 to $10.75.

Dull at Pittsburgh

Pittsburgh, Aug. 25.—The iron and steel scrap market, if such a thing is possible, is quieter now than a week ago and prices are sentimentally weaker. Jobbers finding it necessary to move tonnages have shaved 25 and even 50 cents off prices nominally representing the market the last few weeks.

Panama Scrap

New York, Aug. 25.—The Chicago House Wrecking Co. is offering in the market in its entirety, or in cargo lots, an estimated lot of 25,000 tons of mixed grades of scrap now in the Panama canal zone. This company some time ago made a blanket purchase from the government of the scrap materials at the canal. Bids from consumers and dealers are being solicited. The scrap market in this district shows some betterment. Sales of heavy melting steel in less than 1,000-ton lots have been made to eastern Pennsylvania steel works at $11, delivered. This same grade has sold in New York City at $9. The supply of steel or other scrap materials now available in this district is limited. Borings especially are scarce, owing to lighter manufacturing operations. This same condition of borings appears to be true in other districts. The supply of wrought pipe also is rather scant and $10.50, delivered, eastern Pennsylvania, is being paid by consumers. Shafting has been selling at $14.50 delivered eastern Pennsylvania.

Users Take Scrap Slowly.

Cleveland Aug. 26.—Whatever inquiry in iron and steel scrap is going in this market as well as sales is confined to small lots. The more important users of scrap lines in this immediate district as well as in both valleys are accepting shipments on contracts slowly some even ordering entire suspension of shipments until further advised. The Cleveland rolling mills are doing very little in the way of output. Prices generally are unchanged probably because of the scarcity of actual transactions.

(*For complete prices see page* 404.)

Nuts, Bolts and Rivets

Cleveland, Aug. 25.—While prices on nuts, bolts and rivets are not quotably higher, the market is showing increased firmness and it is expected that advances will be made in the near future, in harmony with advances in other finished materials. Some inquiry for nuts and bolts is coming from Canada and there has also been some foreign inquiry for rivets, but up to the present time no actual foreign business resulting from the war has developed.

Queer Inquiries

Received by Steel Makers from Foreign Countries

New York, Aug. 25.—Some curious inquiries have been included among the numerous communications which iron and steel makers in this country now are receiving from various foreign countries. One eastern Pennsylvania plate mill was asked to submit a proposition for delivery to Austria upon light plates which were to be used for personal armor against rifle bullets.

Another eastern Pennsylvania steel maker received an inquiry for 40,000 gun barrels for infantry arms and as he did not manufacture such products, the matter was referred to another works.

Inquiries have come in to eastern mills for seamless tubes from Christiana, Norway; for sheet bars from Great Britain; for billets from England, Scotland and Italy; for plain structural material from India, Straits Settlement and South Africa; for sheets from Canada; for pig iron from Japan; for rails from South America and other countries and many other inquiries for miscellaneous materials from practically all parts of the globe.

R. M. Rush, Pittsburgh representative of the Kerr Turbine Co., Wellsville, N. Y., is spending a vacation in Canada.

Heavier Movement

Of Iron Ore from Lake Superior — Very Light Buying

Iron ore is moving rapidly on the lakes, though there is no general change in the situation. Furnacemen have placed a few small orders for ore during the present week and some additional figuring is being done. The largest sale reported is for 15,000 tons, but shippers are not expecting much. The season is regarded as pretty well advanced for heavy buying. It is expected that about 6,000,000 tons will be moved during the present month.

Eastern Market Very Narrow

New York, Aug. 25.—Apart from some selling of lots of local eastern ores at about 7 cents per unit, delivered, the lack of interest in ore among eastern consumers has continued. Sellers found it impossible to interest eastern furnaces in a cargo of Newfoundland ore at any price. The final cargo of Wabana, Newfoundland, ore to fill out the present contracts, will arrive the latter part of September. The trans-Atlantic movement of ore to the eastern market remains very small. There was some arrival of Swedish ore in the week and one cargo of Spanish ore now is afloat. Difficulty was experienced by the sellers in obtaining the charter for another cargo of Spanish ore. Cuban shipments are not being interfered with, but are light owing to trade conditions.

Jobbers' Prices

Are Advanced in Philadelphia District in Line with Mill Quotations

Philadelphia, Aug. 24.—Jobbers in the Philadelphia district have advanced prices $1 to $2 a ton in line with the recent change in mill schedules. They now are quoting 1.70c, Philadelphia, for iron bars and 1.75c for steel bars, plates and shapes. The volume of trade while a little better shows no distinct improvement.

Sales Show Slight Slump

Cincinnati, Aug. 24.—Warehouse business has slowed up a little during the past few days, but it is still better than at this time last month. Sales have been largely for building materials, as considerable building is being done in and around Cincinnati. Hoops are still selling at 1.80c in comparison with 2.15c in an adjoining territory. Plates and shapes are specially firm at from 1.80c to 1.90c. Prices are unchanged, and the present level is expected to hold until fall unless much better business develops.

Not Yet Advanced

Cleveland, Aug. 25.—No advances in warehouse prices have yet been made, as the prices which have prevailed for some time were made when shapes, plates and bars were on a 1.20c, Pittsburgh, basis. As warehouse prices have not been reduced in harmony with mill prices, it is not expected that the former will be advanced until 1.25c is established as the mill price.

Good Demand

Chicago, Aug. 25.—Although mill prices on steel sheets have advanced $6 per ton within the past month, warehousemen have advanced sheets only $2 per ton, which makes No. 10 gage blue annealed 1.95c, No. 28 gage black 2.55c, and No. 28 gage galvanized 3.55c. No advance has been made on bars, shapes and plates which remain at 1.65c and 1.75c.

Demand for iron and steel products from store continues steady and sellers find no particular change in the volume of business.

Not Brisk in East

New York, Aug. 25.—There has been a gradual increase in the demand from store with leading sellers in this territory, but with prompt deliveries still obtainable without trouble from the mills, the warehouse trade is not brisk. Prices in this territory have not been altered.

Tight Money Conditions

Interfere With Railroad Buying—Placing of Pending Business in Doubt

New York, Aug. 25. — Unsettled financial conditions apparently still exercise a very deterrent effect upon buying of iron and steel supplies by the railroads and the activity in the market of these consumers is very narrow. Some eastern makers report a more liberal demand for tie plates, splice bars and other track supplies from different roads, but, on the other hand, they have received some suspensions from lines in the cotton-carrying belt, such as the Seaboard Air Line.

The car market well reflects the difficulty of financing important expenditures. There is practically no active inquiry, though the block of cars for the Southern Pacific still is receiving attention. Illustrating the prevailing conditions, the Cincinnati, Hamilton & Dayton railroad has placed 2,000 cars, subject to its ability to execute banking arrangements by Oct. 1; if not, the orders are to be automatically cancelled. Builders have been figuring upon upwards of 200 locomotives, but have little hope that the majority of these will develop into orders soon. Car manufacturers are giving some thought to export possibilities in South America, where Germany and Belgium have been large sellers. Some appliance manufacturers are sending representatives there to size up the ground.

Several export inquiries for rails are pending, but these are being held up by difficulties of transportation. Some domestic rail tonnage for forward delivery is under negotiation in this city. The Cambria Steel Co. received 6,000 tons of the recent Baltimore & Ohio order. An inquiry for 1,500 tons of 30-pound rails for Arizona is current.

Buying is Slack

Chicago, Aug. 25.—The market for railway freight cars is unusually slow and with the exception of the order by the C., H. & D. for 2,000 box cars, subject to withdrawal before Oct. 1 if financing cannot be accomplished, there is little of interest. The inquiry of the Harriman line for 4,000 box cars, withdrawn recently, has not been reinstated.

CARS AND LOCOMOTIVES.

The Cincinnati, Hamilton & Dayton railroad has ordered 1,000 box cars from the Mount Vernon Car Mfg. Co. and 1,000 hopper cars from the Cambria Steel Co., subject to future financial arrangements. This road also has ordered 25 Mikado and 5 Pacific type locomotives from the Lima Locomotive Corporation on the same conditions.

Tennessee Company Will Not Curtail

President George Gordon Crawford has announced that, contrary to rumors, there is no curtailment of activity of any kind contemplated at the steel plants and rolling mills of the Tennessee Coal, Iron & Railroad Co., and that the recently announced improvements and expansions in various branches of the corporation will be carried out.

Slow Shipments

Being Made by English Furnaces Under War Conditions

New York, Aug. 25.—Operations of blast furnaces in England and Scotland had not been sharply affected by war disturbances up to Aug. 13, according to statistics which just have reached this country. On that date, 56 furnaces were blowing in Scotland, compared with an equal number on Aug. 6, 52 on July 30, and 53 on July 23. In the Middlesbrough district, there were 72 stacks active, compared with 76 on Aug. 6, 75 on July 30, and 75 on July 23. In the Cumberland district, the active stacks numbered 19 on Aug. 13, 22 on Aug. 6, 22 on July 30, and 22 on July 23. On Aug. 12, 1913, the furnaces in blast were 87 in Scotland, 89 in Middlesbrough and 24 in Cumberland.

Shipments of iron from the three districts, however, more clearly show the retarded movement of trade. During the week of Aug. 13, the Middlesbrough district shipped 8,210 tons, against 34,757 tons on the corresponding date in 1913 or a decrease of 26,547 tons. Shipments from Middlesbrough this year to date have been 700,856 tons, against 726,272 tons for a similar period last year. Scotland shipments to Aug. 8 were 138,247 tons, a loss of 15,350 tons over last year, while deliveries from Cumberland for the same period were 147,937 tons, a decrease of 23,904 tons.

Middlesbrough stocks on Aug. 13 were 87,783, an increase of 3,560 tons over the preceding week, which, in turn, had increased 1,022 tons. On Jan. 1, 1914, the Middlesbrough stocks were 138,707 and on the corresponding date a year ago were 190,511 tons. Cumberland stocks on Aug. 13 were 3,585 tons, compared with 3,595 tons the preceding week and 8,958 tons on Jan. 1. A year ago they were 20,679 tons.

Signed Amalgamated Scale

Ranks of the Amalgamated Association of Iron, Steel and Tin Workers were increased last week when Brown & Co., Inc., operating a 25-furnace puddling mill at Pittsburgh, signed the wage scale of that organization. Puddlers employed at the Brown mill were former members of the United Sons of Vulcan which controlled the plant the last five or six years. Officers of the Amalgamated Association report that many former members of the Sons of Vulcan have been joining Amalgamated lodges. The United Sons of Vulcan went on a strike July 1, 1913, when mill owners refused to sign a flat scale asking $7 a ton for puddling and the strike has not been formally declared off, although all mills controlled by that body have been operating as usual for nine or ten months. Members of the organization say the union still exists.

Heavy Inquiry

For Semi-Finished Material for Export

New York, Aug. 26. (By wire.)—Heavy export inquiry continues. A large English works has sent out an inquiry for 50,000 tons of billets, sheets, tubes, rounds and other forms of semi-finished materials. Another inquiry is for 10,000 tons of small billets for British Isles. This is different from the 10,000 tons for Glasgow, previously reported. Another lot of 1,500 to 2,000 tons of small billets is pending. Little foreign business, so far as independents are concerned, has been closed owing to uncertainties due to the war.

Will Resume

Several Michigan Furnaces Ready to be Blown in

Chicago, Aug. 24.—Newberry furnace of the Lake Superior Iron & Chemical Co. is to be put in blast Sept. 10 after being out several months. Part of the working force has been retained through the period of idleness, making repairs. This company's furnaces at Elk Rapids and Boyne City have been in blast through the summer. Ashland furnace and the chemical plant now being built to replace the former one destroyed by fire earlier in the summer are expected to resume operations Sept. 1.

Less Favorable Crop Estimate

Less Favorable Crop Estimate

Buffalo, Aug. 25.—The steel and iron interests in the Buffalo district are advised of the shutting down of Canadian agricultural implement manufacturing concerns, because of the conditions developing in the northwest, where the estimate of crops is not as favorable as it was a month ago.

William W. Eccles, treasurer of the Richard Eccles Co., manufacturer of vehicle forgings, Auburn, N. Y., died last week. He had been connected with the company for more than 20 years and was in charge of the manufacturing department.

METAL MARKETS

New York

Aug. 25.

Copper.—Except for a slightly weaker tendency which may be regarded as largely sentimental in the absence of consequential sales, the copper situation has developed no appreciable change. Important sellers continue to regard the situation as purely nominal because transactions are so few. Exports of copper are going forward more freely, shipments this month to date totalling 15,404 tons, of which 4,260 tons went forward today. This in a measure seems accountable for a slightly better feeling in the market. Electrolytic is quotable at 12.37½c to 12.50c, New York, 30 days and at 12.12½c to 12.25c, cash, New York. Prime lake copper is quiet and ordinary brands continue to be quoted at 12.62½c to 12.75c, cash New York.

Tin.—After a week of considerable fluctuation, an easier condition of spot tin is more pronounced and with little buying being done, 40c to 41c, New York, represents today's market. There are some reports that 40c, was undersold, but sales the past few days have been for minimum quantities, as buyers, having their August requirements well in hand no longer are excited over reported shortages. The movement of tin from abroad is heavier and more is afloat, this condition tending to stabilize the market. Arrivals in the week were 245 tons, of which 110 tons came in today, making the month's imports to date 2,330 tons. The Minnehaha has sailed with 750 tons and the total afloat is 1,620 tons.

Lead.—There is practically no activity in the lead market and prices are unchanged at 3.90c, New York, or 3.70c, St. Louis.

Spelter.—Demand for spelter from abroad continues very brisk and with domestic buyers beginning to give more attention to their requirements, the market appears strong. Export sales of spelter are being made at 5.95c and 6 cents, New York, but this price has been above the domestic market. Today the domestic market has moved up closer to the figures being paid by foreign buyers and is quoted at 5.75c to 5.87½c, New York and 5.62½c to 5.75c, St. Louis.

Antimony.—The action of Japan in actively engaging in the present war is expected further to complicate an already tense situation in antimony and higher prices are expected. The higher grades of antimony have been so scarce as to be practically nominal and Chinese has been quoted at 13c to 14c, New York, duty paid. There has been little buying, as buyers are well covered.

Aluminum.—Inquiry for No. 1 aluminum ingots for European shipment now is coming out and a good-sized tonnage is under negotiation. This is probably the most interesting development in the market for this material. Foreign aluminum except for an occasional odd lot of spot, is practically out of the market and domestic makers completely control the situation at present. Domestic spot No. 1 ingots are quoted at 20c to 21c, New York, and on future deliveries at about 19.50c, delivered New York. Domestic buying is not heavy.

The Terry Steam Turbine Co., Hartford, Conn., has appointed Fidanque Brothers & Sons of New York and Panama, with main office at 15 Whitehall street, New York, representatives for the Republic of Panama and the canal zone. On Aug. 1, the Cleveland office of the Terry Steam Turbine Co., in charge of L. G. Findlay, was moved from 710 New England building to 503 Union building.

Change for Better, Says Gary

In Conditions of the Business World—Gives Roosevelt Much Credit—Improved Relations of Labor and Capital

The Outlook for Aug. 22 publishes an interview with Judge E. H. Gary, of the United States Steel Corporation. The interview is in part as follows: :

"Does a big corporation ever do anything humanitarian nowadays except to appease opinion or to redound dividends?"

Like a steel trap he closed on the question.

"Yes," he said, and he settled his chin forward.

"Since the public-be-damned period has there been a change?"

"Yes, there's been a change."

"For the better?"

"Yes, there's been a great change for the better. I think that in the walk and talk of business men there's been a change for the better."

He groped for a more emphatic word.

"There's been an awakening—a great awakening."

"The result of public agitation?"

The judge shook his head slowly. He regretted once more, it seemed, the idea that nothing is good in the large corporation save what the public has made good.

It was suggested that, in the last analysis, the productivity of labor in a corporation is contingent upon the general estimate of that corporation; that on the continent France and Germany restrict bank loans vigorously from investment in American corporations not approved by public opinion, wherefore United States corporations are some five billions short; and that even locally the order book is the barometer and the balancing consideration—that a customer complains to his retailer, the retailer complains to his jobber.

Judge Gary anticipated further speculation by a vigorous swing of his swivel chair. He often finishes the speech of another.

"Eight or ten years ago," he explained, simply, "I said in an interview with the *World*, I remember, that we were all doing wrong, that it was for us to set things right. I am on record as saying that many times since. In that interview I spoke—not too unkindly, I hope—of men like Belmont, and some of them resented by dealing in personalities. There's been a great change since then."

"What accounts for the change?"

The Judge considered. "As far as I am concerned," he said, conclusively, "it is largely traceable to Roosevelt. . . . I know him well. I have considered every suggestion for improving business conditions that he has ever made. I have tried to adopt many of them. . . . . Whenever a newspaper or a magazine makes a fair and honest suggestion, I always try to adopt it; but we have made a great many changes without suggestions from the public at all."

"We suppose," Judge Gary explained, leaning back, raising one neatly shod foot to the end of the table, "that we are on a very frendly footing with our men. We believe our relation with our men is getting better and better. They have been very fair to us." He considered, and then he went on to state what approaches the desired new spirit in American business: "It is difficult to say in a word, but there is developing and becoming fixed in our companies at least, all along the line, a determination to conduct affairs in such a way that we will not cause injury to anybody, and, on the contrary, that we will benefit everybody affected by us; and that includes fair and decent and honest treatment of our employes, our stockholders, our competitors in business, our customers, and the general public, because we believe it is not only good policy from the standpoint of pecuniary success, but better because we believe it is right."

It was observed that such a statement was comprehensive.

"It is intended to be comprehensive," Judge Gary answered, dropping his foot to the floor and sitting forward. "If employers will conduct their affairs in such a way as to satisfy their men, their competitor, stockholders, customers, and the general public—if the employers are fair in every respect—it is only a question of time when they will be supported in everything to which they are entitled from the standpoint of good morals." He paused, and then went on: "It is a stupendous question. In the past, capitalists and employers were not inclined to recognize the rights and interests of others to the extent that they ought. They acted on the basis that they were dealing at arm's length with labor and their interests, therefore felt they were justified in doing no more for their part than went to promote their individual interests. I believe, however, there has been a very great change. I believe that, as a result, capital and labor are coming together, and that we shall see a very decided improvement in the general attitude of both."

Illness of D. M. Parry

Alarming reports were published during the past week concerning the condition of D. M. Parry, ex-president of the National Association of Manufacturers, who is ill in San Francisco. The latest news from his bedside is very encouraging. On Feb. 10, 1914, with John Kirby Jr., of Dayton, O., another ex-president of the National Association of Manufacturers, and Dr. A. Snowden, Mr. Parry sailed from San Francisco for several months' investigation of commerce and economical conditions in Australia and New Zealand. This Australasian commission was endeavoring to complete its trip around the world when the European war broke out, whereupon it returned from Siberia to San Francisco. A cablegram from Honolulu on Aug. 21 stated that Mr. Parry had collapsed from nervous trouble, but upon landing at San Francisco, he was reported to be improved with good prospects for a complete recovery. Mr. Parry is president of the Parry Mfg. Co., Indianapolis, which employs over 2,000 people.

Edward J. Henesey and Martin F. Mann, formerly with the H. C. Harrower Co., and later secretary and shop superintendent of the Farrar Iron & Steel Co., respectively, having disposed of their holdings in the latter company, will shortly incorporate a company for the fabrication and erection of structural steel for buildings.

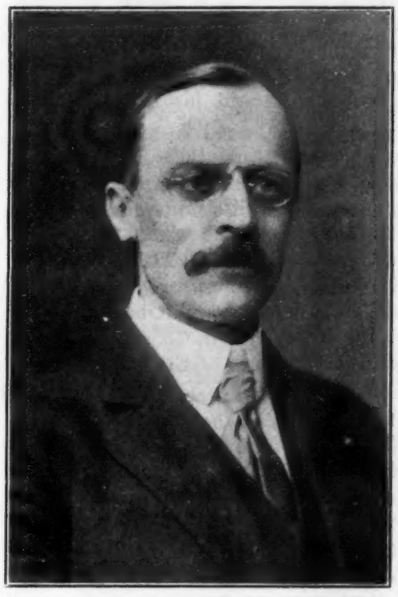
A. J. Gardiner, for many years connected with the Landis Tool Co., Waynesboro, Pa., has severed his connections with that concern to accept a position with the Modern Tool Co., Erie, Pa., covering the same territory as when with the Landis Tool Co. The Modern Tool Co. has just brought out a complete line of self-contained single pulley drive grinding machines.

George W. English, treasurer of the Zug Iron & Steel Co., Pittsburgh, has resigned. His successor has not been appointed.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

J. J. Bever, one of the new members of the American Iron and Steel Institute, is the manager of the foundry department of the Otis Steel Co., Cleveland, having charge of both sales and production of the steel foundry. He is a member of the Cleveland Engineering Society, Cleveland Chamber of Commerce and Cleveland Athletic Club. Mr. Bever has been with the Otis Steel Co. since 1899. He has had practical experience in pattern and machine shop, foundry, engineering, sales and general office work. He formerly was associated with the Walker Mfg. Co. and the Westinghouse Electric & Mfg. Co. He is recognized as an authority on steel rolls and general foundry practice. During his connection with the Otis Steel Co., the foundry has grown continuously and in the past 10 years has quadrupled its capacity. The foundry handles a large variety of work, making steel castings from 1 pound to 150,000 pounds. The first rolls used in this country containing over 0.1 per cent carbon were made at the Otis foundry.



J. J. BEVER
New Member American Iron and Steel Institute

L. H. Underwood, formerly superintendent of blast furnaces at the Riverside, W. Va., works of the National Tube Co., has been appointed an assistant superintendent of the by-product coke department at the Gary, Ind., works of the Illinois Steel Co.

E. D. Frohman, Pittsburgh manager of the S. Obermayer Co., Pittsburgh, foundry supply dealer, is enjoying a vacation at the Thousand Islands.

S. Proctor Brady has been elected president of the recently reorganized Poole Engineering & Machine Co., Baltimore.

A. F. Huston, president of the Lukens Iron & Steel Co., who has been detained in Paris by war conditions returned to this country last week on the Chicago.

The Copp Stove Co., Ltd., Fort William, Ont., Can., announces the retirement of Fred W. King, general manager. He was succeeded Aug. 1 by W. E. Raymond.

J. C. McQuiston, advertising manager for the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has returned from an extended automobile trip through central western states.

J. C. Davis, vice president; Harry Allan, assistant vice president, and J. S. Stoddard, chief engineer of the American Steel Foundries, Chicago, inspected the plant of the company at Sharon, Pa., last week.

L. Selim has accepted the position of chief chemist and metallurgist with the Otis Steel Co., Cleveland, taking effect Sept. 1. For the past seven years, he has been in charge of the chemical and metallurgical laboratory of the Lake Superior Iron & Chemical Co. Since June 1, he has been employed on special work at the plant of the Zenith Furnace Co., Duluth, Minn.

Oliver O. Bowman, vice president of the Jordan L. Mott Iron Co., Trenton, N. J., and president of the Trenton Fire Clay & Porcelain Co., has returned from Europe. Mr. Bowman had considerable difficulty in booking return passage because of the European conflict. He left Trenton in the early part of summer with Mrs. Bowman for a pleasure and business trip to foreign lands.

E. St. Elmo Lewis has been elected vice president and general manager of the Art Metal Construction Co., whose factory headquarters are at Jamestown, N. Y. For the past ten years Mr. Lewis has been advertising manager of the Burroughs Adding Machine Co., and has been identified prominently with the creation of new markets and the development of old markets for that company. The Art Metal Construction Co. is a manufacturer of metal furniture.

James C. Alley, recently elected to membership in the American Iron and Steel Institute, was born near Babylon, L. I., later moving to New York City, where he attended the public schools. After graduating from high school, he entered the iron and steel business, representing various companies in eastern territory. For the past 15 years he has been sales agent of the Warwick Iron & Steel Co., and its successor, the Eastern Steel Co.

JAMES C. ALLEY
New Member American Iron and Steel Institute

F. M. Wilmot, secretary and manager of the Carnegie Hero Fund Commission, Pittsburgh, has written an interesting letter to C. B. Ebersol, assistant manager of the commission, from London, describing scenes and demonstrations in that city when England declared war on Germany. Mr. Wilmot sailed from New York on the Hamburg-American steamship, Imperator, July 18, and had planned to visit points of interest in Europe. These plans were abandoned, because of the war.

Steel Output

Of Canada — Ingots, Castings and Rolled Products

The bureau of statistics of the American Iron and Steel Institute has received from the manufacturers statistics of the production of steel ingots and castings and all kinds of finished rolled forms of iron and steel in the Dominion of Canada in 1913.

The production of all kinds of steel ingots and castings in Canada in 1913 amounted to 1,042,503 gross tons, against 853,031 tons in 1912, an increase of 189,472 tons, or over 22.2 per cent.

Of the total in 1913 about 1,006,149 tons were ingots and about 36,354 tons were direct steel castings, against about 820,792 tons of ingots and about 32,239 tons of castings in 1912. The production of steel ingots and castings in 1913 was much the largest in the history of the Dominion. The growth in late years has been very rapid. Since 1908 the output has increased over 100 per cent.

The total for 1913 includes about 1,852 tons of alloy-treated steel castings, against about 1,294 tons of similarly treated steel ingots and castings in 1912.

In 1913 there were 16 works in four provinces which made steel ingots or castings, as compared with 14 works in four provinces in 1912. The number of idle steel works in 1913 was four, as compared with three in 1912.

The production of Bessemer and steel ingots and castings in 1913 amounted to 273,391 tons, against 207,569 tons in 1912, an increase of 65,822 tons, or over 31.7 per cent, while the production of open-hearth steel ingots and castings in 1913 amounted to 768,663 tons, against 645,062 tons in 1912, an increase of 123,601 tons, or over 19.1 per cent. Almost all the Bessemer steel made in the two years was in the form of ingots.

Of the total production of open-hearth steel in 1913, 736,562 gross tons were ingots and 32,101 tons were castings, against 617,061 tons of ingots and 28,001 tons of castings in 1912. In both years all the open-hearth ingots were made by the basic process, but the castings were made by both the acid and the basic processes. One plant made steel by the duplex process in 1912 and 1913.

The total production of steel ingots only in 1913, omitting direct steel castings, amounted to 1,006,149 tons, against 820,792 tons in 1912, an increase of 185,357 tons, or over 22.5 per cent.

In 1913 there were six works in two provinces which made steel ingots, against four works in two provinces in 1912.

The total production of all kinds of steel castings in 1913, omitting steel ingots, amounted to 36,354 tons, against 32,239 tons in 1912, an increase of 4,115 tons. Of the total output in 1913 about 3,809 tons were made by the Bessemer process, against about 3,838 tons in 1912; about 32,101 tons were made by the open-hearth process, against about 28,001 tons in 1912; and about 444 tons were made by special processes, against about 400 tons in 1912.

In 1913 there were 13 works in four provinces which made steel castings, against 12 works in four provinces in 1912.

Production of Pig Iron

The production of pig iron in Canada in the first six months of 1914, including ferro-silicon and ferro-phosphorus, amounted to 442,430 gross tons, against 469,137 tons in the last half of 1913, a decrease of 26,707 tons, or nearly 5.7 per cent. In the first half of 1913 the output was 545,981 tons. Comparing the output in the first half of 1914 with the output in the first half of 1913 shows a decrease in the first half of 1914 of 103,551 tons, or over 18.9 per cent. Of the total in the first six months of 1914, 433,733 tons were made with coke and 8,697 tons were made with charcoal, electricity, etc.

Death of T. A. Griffin

Thomas A. Griffin, chairman of the board of directors of the Griffin Wheel Co., died on the steamer Korea, en route from Yokohama, Japan, to Honolulu, H. I., Aug. 12. He was completing a trip around the world on which he started from New York, Jan. 13, 1914.

Mr. Griffin was born in Rochester, N. Y., Aug. 28, 1852. He has been in the car wheel manufacturing business continuously since 1868. In 1875, he went from Rochester, N. Y., to Detroit, where he engaged in the car wheel business with his father, the late Thomas F. Griffin. In 1880, he moved to Chicago and organized the Griffin & Wells Foundry Co. In 1886, this company was merged into the Griffin Wheel & Foundry Co. From the original plant in Chicago have grown three foundries in Chicago, as well as foundries in Boston, Detroit, St. Paul, Denver, Kansas City, Tacoma and Los Angeles.

Mr. Griffin, while occupying the position of chairman of the board of directors of the Griffin Wheel Co., has not been active in its management for some years. Mr. Griffin was a member of various clubs, including the Chicago Club, Chicago Athletic Association and South Shore Country Club of Chicago, the Metropolitan Club, Racquet and Tennis Club and the Lambs, of New York, the Minnesota Club, of St. Paul, Maryland Club, of Baltimore, Denver Club, of Denver, and the British Iron and Steel Institute.

Two children survive him, George Francis Griffin, of Chicago, a vice president of the company, and Mrs. Carl P. Dennett, of Boston, Mass. The body will reach Chicago today.

Harrington Green, aged 24, son of James A. Green, president of Matthew Addy & Co., Cincinnati, died on Aug. 25, following a slight operation. Mr. Green had rallied successfully from the effects of the operation, but complications resulting from the anaesthetic caused his death.

John Daker, aged 70 years, Detroit representative of the Firth-Sterling Steel Co., Pittsburgh, died at his home in Detroit last week. For a number of years, he was in the Methodist ministry. John Daker Jr., and C. H. Daker, sons, are respectively connected with the Pittsburgh offices of Eaton, Rhodes & Co. and Matthew Addy & Co., both of Cincinnati.

Charles A. Ricks, secretary and assistant treasurer of the Kuhlman Car Co., Cleveland, was overcome by an attack of heart failure at his home in Cleveland, Aug. 24, and died within a few minutes. Mr. Ricks was 45 years of age and was born in Massillon, O. About ten years ago, at the time of the reorganization of the Kuhlman Car Co., Mr. Ricks helped in the reorganization, and at the time of taking over of the Kuhlman company by the J. G. Brill Co., several years later, he was made secretary and assistant treasurer.

Ralph Emerson, head of the Emerson-Brantingham Co., Rockford, Ill., maker of agricultural implements and tractors, died at his home, Aug. 19, aged 83 years. He had been in the agricultural implement business since before the civil war and was represented in patent litigations in the federal court at Milwaukee by Abraham Lincoln. He was head of Emerson, Talcott & Co., then of the Emerson Mfg. Co., and more recently of the Emerson-Brantingham Co. He made many gifts to charity both in his home city and at Colebrook, Conn., where he maintained a summer home in the vicinity of his birthplace. He was a cousin of Ralph Waldo Emerson.

THE ABC OF IRON AND STEEL

Making Steel Castings--III

Pouring Steel Castings

BY R A BULL

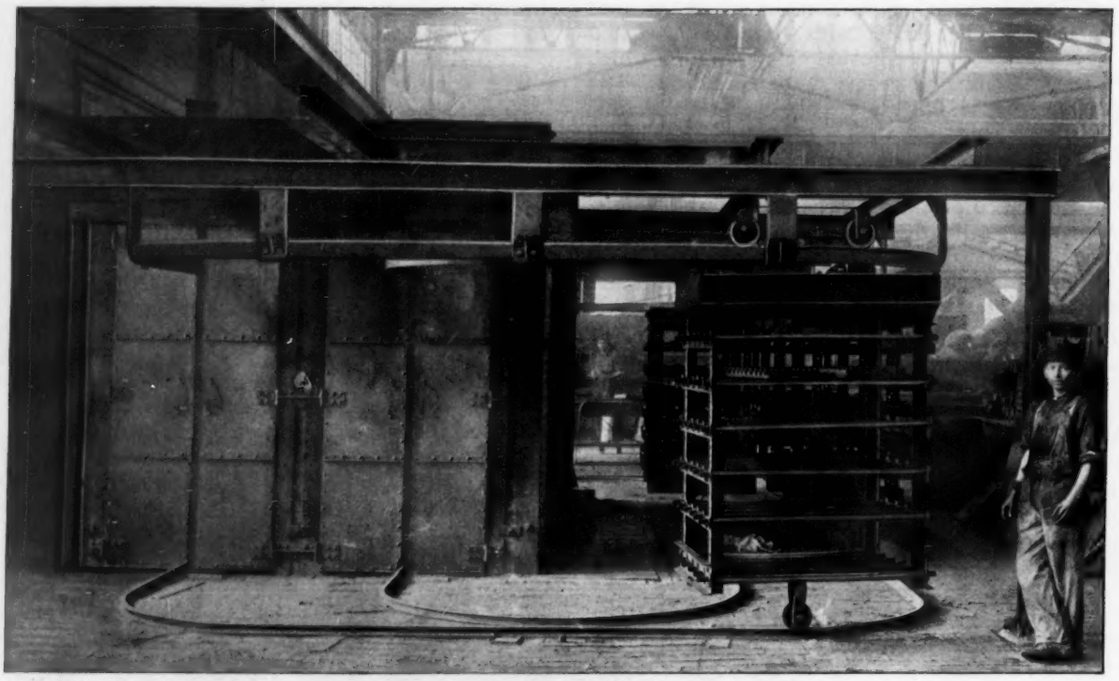
STEEL is tapped into a bottom-poured ladle, lined with fire brick, coated with pre-heated clay lining which must be renewed for each heat. The stopper-rod is lined with fire-clay sleeves, and is usually equipped with a graphite head, which seats in a fire-clay nozzle. The lining of ladle and rod, and the careful adjustment of the latter and the slide which enables the rod to move vertically by manipulation of a lever in the hands of the ladle-man, and, in fact, every detail of the ladle must be given constant and careful attention. Small holes are punched through the side plates of the ladle, as in the case of the Bessemer converter, to let the steam generated in the lining escape.

The pouring of steel castings involves many problems not possible to discuss here. Leaks are of much more consequence in the foundry than in the mill and occasionally produce heavy loss. It is easier to empty a constantly flowing stream into a few large cavities such as ingot molds whose mouths are of liberal proportions than to pour a ladle which has a badly cut and leaking nozzle into small molds with restricted gates. Because of the longer time required for teeming a foundry ladle, as well as for a reason previously given, the metal must be hotter, thus more quickly attacking ladle materials of inferior quality. Great caution must be exercised to avoid straining certain molds under free pressure of the stream, and skill should be applied to the thorough feeding of the risers or sink-heads which act as reservoirs to counteract the natural shrinkage of steel which in unrestricted molds sometimes reaches 5/16 inch

The following articles of this series previously have been published in THE IRON TRADE REVIEW: "Iron Ore and Mining Operations," Jan. 5; "Beneficiating Iron Ores," Feb. 2; "Rules for Figuring Penalties and Premiums on Lake Superior Iron Ores," March 9; "Transportation of Iron Ore on the Great Lakes," March 16 and April 13; "Ore-Handling at Lower Lake Ports," Oct. 12, 1911; "The Manufacture of Bee-Hive Coke," Jan. 4, 1912; "Pig Iron and Its Method of Manufacture," Jan. 2; "Manufacture of Wrought Iron," Feb. 6; "Manufacture of Crucible Steel," April 3 and April 10; "Manufacture of Open-Hearth Steel," May 15, 22 and 29, June 5 and 12; "The Rolling Mill Industry," Aug. 7, 14, 21 and 28; "Wire and Wire Rods," Oct. 2, 9, 16, 23 and 30, 1913; "Making Bessemer Steel," May 21; "Making Steel Castings," Aug. 6 and 20, 1914.

MOLDING TRUCK FRAMES IN A LARGE STEEL FOUNDRY

per foot. In basic shops it is well to so adjust the position of the ladle when receiving a heat that less than 6 inches of slag will remain on the metal, the balance overflowing into the pit. The presence of basic slag in any amount will affect the composition of the underlying steel, and the heavier the slag burden, the more marked the effect. The carbon remains stationary, but the metal always takes up some of the phosphorus and frequently a little of the sulphur from the excess of these elements in the reducing agent, and generally gives up by oxidation small percentages of manganese and silicon. Plants making the highest grade steel castings watch these conditions very closely. It is not difficult to place safeguards around the approval of the last basic metal poured, through the agency of chemical analysis. Acid slag, of course, contains no larger percentages of phosphorus and sulphur than does acid steel, and does not present the above complications.



CONTINUOUS CORE OVENS IN A STEEL FOUNDRY

Acid vs. Basic Steel

Before leaving the general subject of the melting and delivery of the steel, a few remarks on the relative advantages of acid and basic steel are not out of place. In most eastern open-hearth foundries, the acid bottom is preferred while the reverse holds true in many open-hearth plants in the middle west. Strictly speaking, the direct operating cost is gaged by the "delivered" price of suitable pig iron and scrap for either process. Acid stock, of necessity being purer, costs considerably more than the lower grade metal which can readily be refined on the basic hearth. It has been pointed out that the acid process permits faster time for heats. This *per se* means less fuel cost, which can be roughly figured at 75 per cent of that common to basic furnaces in the foundry where records show variously from 40 to 50 gallons of fuel oil, from 6,000 to 8,000 cubic feet of natural gas and from 800 to 1,000 pounds of coal for producer gas, per ton of metal charged. It has also been noted that the acid furnace has a longer life than the basic, which implies lower maintenance cost per heat. But the indirect cost is an item not always regarded and may be of considerable magnitude as represented by a large percentage of cracked castings due to high phosphorus or high sulphur, or both. The degree of purity commonly attained in basic steel cannot be reached in commercial acid melting, and this factor of great importance to superior quality should be borne in mind by the purchaser of castings to which severe stresses may be applied and proportionately by the foundryman catering to certain industries. It is not uncommon for basic steel castings of highest grade to analyze less than 0.015 per cent in phosphorus, occasionally being de-phosphorized to an amount represented by the third decimal, at the same time containing sulphur in no greater proportion than 0.025 per cent. Not many years ago it was believed by many that the removal of oxygen, aggressively present in basic steel shortly before tapping, could not be effected with desired success. Judicious selection and use of deoxidizers permits the teeming of perfectly quiet and homogeneous metal, as regularly as heats are melted.

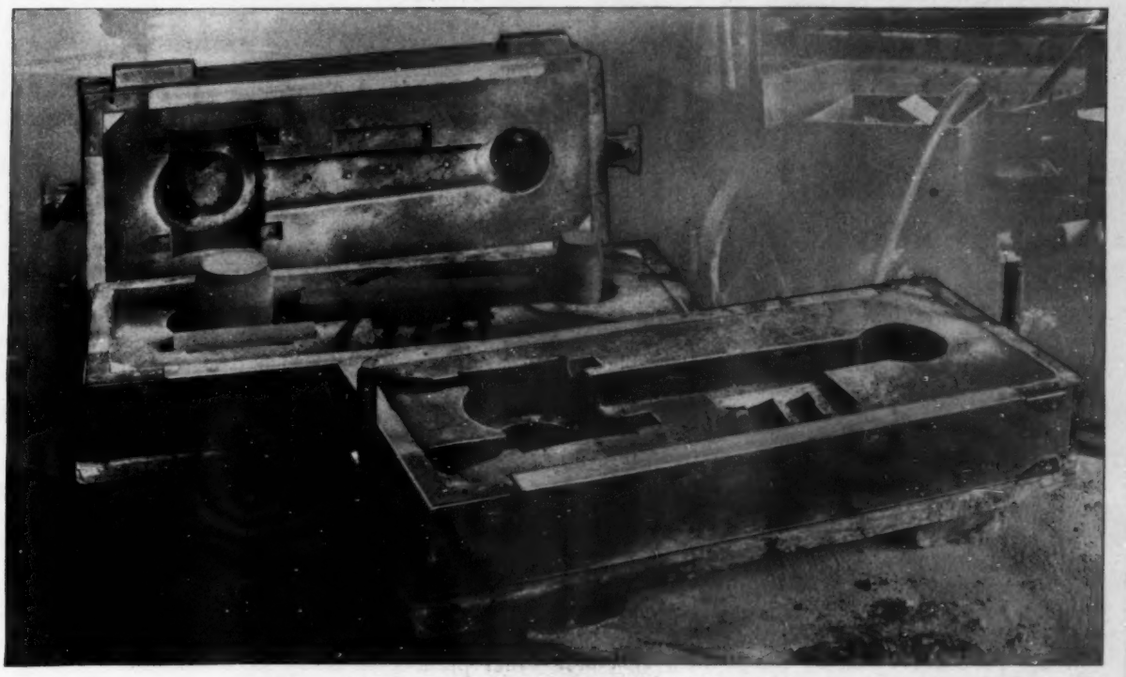
Patterns for the Steel Foundry

As the great bulk of cast steel is made in open-hearth foundries, and as general shop operations there are by their magnitude the more complex and interesting, our description of manufacture subsequent to delivery of the hot metal will have special reference to plants operating the Siemens-Martin furnace. In so doing, space prevents more than a brief outline of certain distinguishing methods. The logical starting point is the pattern shop.

Because of the excessive contraction of steel in solidifying, shrinkage allowances for patterns and core boxes must be liberal where the design affords reasonable opportunity for natural contraction. It has been mentioned that a steel casting of the simplest design will shrink 5/16 inch per foot, but it must be borne in mind that most castings have many members, and the shape and position of these frequently tax the ingenuity and experience of the patternmaker, who expects to find a casting of approximately correct dimensions. Sometimes only an eighth of an inch is found to be the proper shrinkage allowance for certain members and occasionally no contraction should be provided for. Indeed it happens to the disgust of the patternmaker, through careless molding, that a casting may seem to have grown when compared with the pattern.

This problem of shrinkage affects the construction of the pattern in other respects than for dimensions. High shrinkage common to steel spells susceptibility to hot cracks, and liberal use of fillets, checking strips, and brackets is resorted to. If the designer permits, openings of small area at dangerous intersections afford splendid means of overcoming many shrinkage troubles, and may paradoxically strengthen a section by reducing the area. Again, if allowed by the purchaser, uniformity of section, or the gradual tapering instead of the abrupt junction of members of different thicknesses helps very greatly in preventing unequal strains in cooling. The experienced pattern foreman is alert to all these conditions, and will, if permitted, construct his patterns accordingly.

Because the mold must be rammed much harder than would be permitted in an iron foundry, the steel shop patterns should be constructed to withstand more severe usage. The scope of open-hearth operations fosters rough and speedy handling and patterns are no exception to the rule which demands that steel foundry equipment shall be "bull-strong and fool-proof". The molder does not always strike the facing with his rammer, and may do serious damage to a frail pattern. If the pattern-members are not well braced by permanent interposed sections, in most cases ties can be applied not to appear on the finished casting, which will prevent springing by harder ramming on one side of a member. Frequently steel castings will warp in cooling and the pattern must be made crooked to equalize this difficulty, and so enable the casting to draw to a straight position. It can be appreciated that the pattern foreman is a very important functionary in the steel foundry, although the general nature of much of his work is so nearly paralleled in the pattern shop of the iron foun-



MOLD FOR CAST STEEL CONNECTING ROD

dry as to prohibit our giving more space to his methods.

Steel Molding and Core-Making

On the molding floor, the material used for facing and core sand is the first noticeable feature that differs from those common to iron founding, and this is principally due to the higher temperature of molten steel. The original sand must be of a very refractory nature, and usually contains from 96 to 99 per cent silica. It is blended with fire clay and water in mixing pans with rollers, or in revolving cylinders, and frequently the facing sand contains, in addition, molasses or glutrin (a residue of great bonding strength obtained from wood-pulp mills). Core sand also contains flour, dextrin (a soluble mucilagenous substance formed from starch), or a manufactured compound having pitch as a base, sometimes rosin, and frequently sea-coal. Occasionally oil is used in steel as in iron foundry core sand. The essential principle in preparing both facing and core sand is to secure a mass having the greatest possible refractory nature combined with a well distributed amount of the required binders, the whole being free from such density as would prevent the passage of gases formed when steel enters the mold, and yet in the case of dried molds or cores, having sufficient combustible or compressible materials to make the sand crumble under the action of the heat, and so permit normal shrinkage in the casting. Both for core and facing mixtures considerable old sand can be used, and many foundries utilize 40 per cent of it in making up their batches. The non-refractory binders that come in direct contact with the metal lose their useful properties, but those that are protected by interior position impart to the used sand considerable adhesive power. This correspondingly reduces the amount of new binder in mixtures carrying old sand. The greater necessity in the steel foundry for maximum strength with minimum bulk of the binders justifies the closest scrutiny in the purchase of flour, compounds, etc., and is served admirably by the use of cement briquette testing machines, chemical analyses and fineness tests.

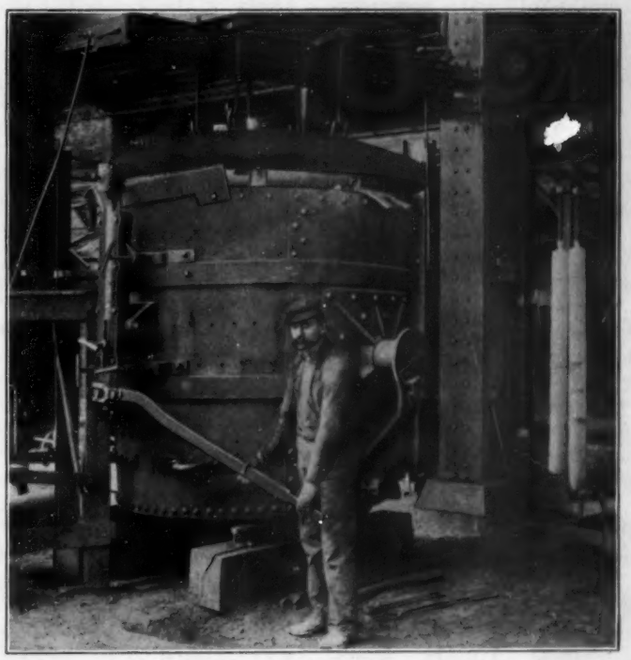
In making the molds, the sand must be densely packed around the pattern to avoid strains. The "squeezer" type of molding machine, common in iron foundries, is conspicuous by its absence in the steel shop. It does not squeeze hard enough. The pneumatic jolter now widely known is employed with much success in many open-hearth plants and greatly reduces labor cost of ramming. Some foundries owning such machines fail to provide adequate crane service and flask equipment to properly serve such units. Molds, empty flasks and sand must be expeditiously handled to obtain full benefit from this mechanical device. In the past three years, electric jar-rammers have been introduced, but these may yet be said to be in the experimental stage. In the open-hearth foundry no other type of machine for packing a mold at present in use can equal for flexibility the hand-controlled pneumatic rammer, and this is very extensively and economically employed in steel-casting plants.

As in pattern shop, so on the molding floor must very careful attention be given to shrinkage. Indeed this may be admitted as one of the chief concerns of the molding department. Improper position of sprues and risers with respect to casting members, proximity of flask bars with relation to gates and headers, hard dense sections in critical locations in molds and cores, inadequate feeding of molds when pouring, heavy fins and very rough surfaces are only a few of the causes for shrinkage cracks, for which neither excess of sulphur or phosphorus, nor over-oxidation (all natural causes) can be blamed. Occasionally where deep members have large spaces between intersections, boxes filling the major portion of the openings between pattern-members are rammed in, and by quick withdrawal after pouring offer to the molding foreman the solution of a difficult shrinkage problem.

Mention of molding floor methods should include a word on green sand facing, which 25 years ago was generally believed impossible to use with success in making sound steel castings. The writer recalls reading in a conservative journal that steel poured in green molds would explode with disastrous consequences. The middle-western steel foundries were the first to demonstrate that green-sand steel-molding was not only possible, but of distinct advantage in making sound castings from designs susceptible to shrinkage checks, by lessening the mold resistance to natural contraction. The writer has found by experiments, to determine the effect of moisture in molds on the specific gravity of steel, that unannealed soft steel cast in perfectly dry molds averages in specific gravity 7.856; that the same steel cast in molds made up of green and dry sand in approximately equivalent parts (which represents regular practice in many steel foundries) averages 7.7, which gives us 480 pounds per cubic foot; and that the identical metal poured in neither oven-dried nor skin-dried sand molds having no dry cores, averages 7.522. It would therefore appear that the density of steel suffers by about 4¼ per cent in being cast in green-sand as compared with that poured in molds free from moisture. This assumes that we may disregard as impossible of proof what appears likely, viz: that steel does not decrease in density in exact proportion as the total space of its blow-holes increases. It would seem that the walls of metal surrounding the gaseous inclusions are solidified under pressure and made more dense than surrounding metal. The selection of green or dry sand should be governed by the design and the intended use for the casting. It is well to bear in mind that at times slightly reduced homogeneity is preferable to shrinkage ruptures, some of which may

affect the fibre stress of an important member without being visible on the surface.

It is to be seen from the above that the main source of blow-holes in steel—those cavities which cause a considerable percentage of rejection—is not that degree of moisture which customarily obtains in green sand. Nor is sponginess always due to oxygen in the metal, though this is an intermittent cause, more often encountered in basic than in acid practice. The molder or coremaker is frequently responsible for a blown casting because proper provision has not been made for venting the gas from mold or core. In steel-molding this is a very important matter, justifying the closest supervision. Occasionally shrinkage cavities are mistaken on casual observation for blow-holes, but intelligent examination reveals the true cause of such defective work, which is remedied by more judicious proportioning or placement of risers, which play a far more important function in steel practice than in iron founding. It has been observed that the steel-pourer should feed the casting till the risers will not receive additional metal. This assumes that extravagantly dimensioned risers are not employed by the foreman molder. Means of reducing the waste metal in some risers consist of agitating the metal in the sink-heads by stirring rods and depositing on them coke, charcoal or "thermit", a patented compound containing aluminum and iron oxide, fused by the agency of magnesium powder. These materials maintain a liquified condition of the risers beyond their normal freezing point. The carbon entering into the first mentioned materials is apt to affect the composition of adjacent parts of the casting and judicious selection of them should be made. The excessive shrinkage of steel provides the rare and apparently extravagant sight of a casting whose shipping weight is duplicated by its sink-heads.



A STEEL FOUNDRY LADLE

Finishing Steel Castings

The finishing department of a steel foundry loses none of its importance because it has no part in the making of castings, and offers many contrasts to the chipping room of a plant operating the cupola. The toughness of the product and the consequent increased difficulty of removing surplus metal at once distinguish it from its neighbors in the iron foundry trade, and afford an important market to the manufacturers of pneumatic chipping hammers, special grinding machines, cutting-off power saws, hydraulic presses, lifting magnets, electric and gas welding outfits, and annealing ovens, none of which find a place in many gray-iron shops, but most of which are so common to other mechanical operations that we need not describe them. Varying with the nature of the product, drills, punches, shapers, planers and slotters—all preferably of heavy duty type—may be included in equipment supplied by machine tool builders. It will thus be perceived that the cost of equipping and operating the department which delivers the product to the consumer involves in the plant making steel castings, always a somewhat greater and frequently a much heavier expenditure than in foundries casting weaker metals. Correspondingly, the pattern shop, molding floor and core room are the main sources from which to seek reduction of steel foundry finishing cost. Dollars spent in these departments often mean hundreds saved in chipping or machining. The annealing of steel castings has been very generally employed, but is a feature of their preparation for service which is no longer universally regarded as essential to their lasting usefulness, provided certain conditions as to chemical composition are satisfied. There are great quantities of steel castings produced whose carbon-content is sufficiently high and whose intended use is so severe as to demand most careful annealing. The uses of cast steel and the ideas of melters are so varied that the analyses of metals poured are rarely alike in many shops. Indeed in the same plant, owing to the variety of the work turned out, may be found steel ranging in carbon from 0.25 to 1.25 per cent and metal with and without several of the elements that make it commercially known as alloy-steel. Most of these combinations are wisely determined upon and many of them leave no alternative but to anneal, to

render the castings suitable for the purpose intended. It has been generally claimed that annealing improves the granular structure, increases ductility and tensile strength, and relieves the internal strains set up by cooling. To the point that the crystals of any steel are reduced in size by proper annealing, there can be taken no exception. But there are many carbon steels which show no improvement in tensile strength upon careful annealing, and there are certain low carbon steels which not only receive no increase in ultimate strength, but remain practically unchanged as to ductility, after this heat treament, and the question as to the advisability of annealing for the relief of internal strains is certainly debatable.

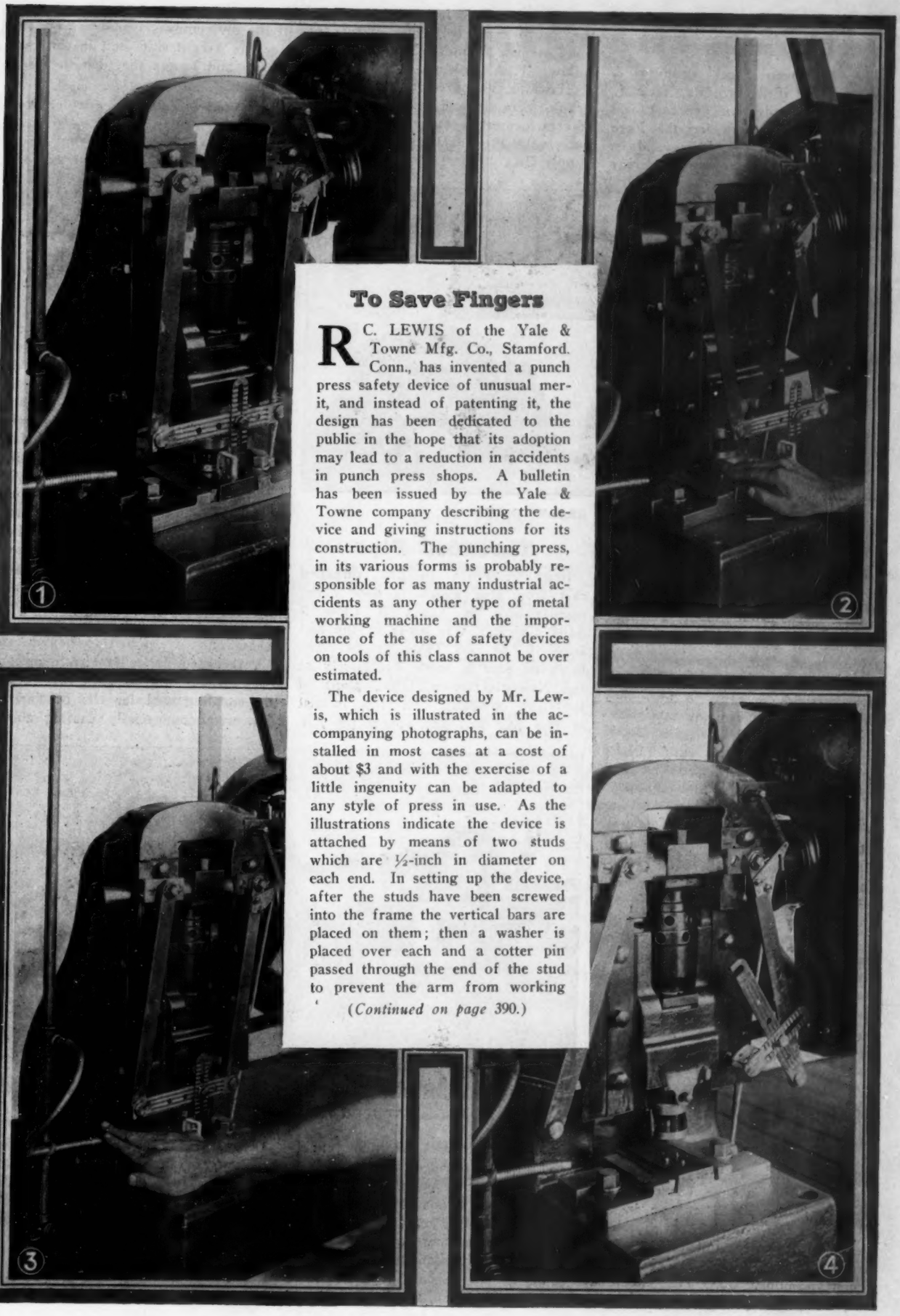
In any case annealing must be scientifically done to render the slightest service. The temperature for the casting should vary somewhat according to its composition, but should not be far from 900 degrees Cent. (determined pyrometrically or by other reliable means) for average steel. There is sometimes a tendency to run the oven very hot to expedite the treatment. This is apt to overheat a light section while securing the desired temperature in a heavy one, or to underheat the latter in getting a thin member just hot enough. When either condition exists, there is a change in the crystalline structure at the junction of heavy and light sections, which augurs well for weakness. Tests readily demonstrate that over-heating renders the annealing operation useless. The structure and physical characteristics of overheated steels return to their original state. Annealing ovens employ gas, oil, coal and other fuels, and afford convenient opportunity for straightening castings, which must otherwise be done cold.

The welding of defects in steel castings is an important and, under reasonable limitations, entirely permissible function. Fouche invented the first oxy-acetylene torch, which has in modified forms been successfully applied to steel foundry work for about 15 years. Welding was formerly done in a blacksmith forge and later by the application of "thermit". Latterly gas and arc welding have largely superceded these methods, requiring less time and expense and being more efficient. In gas welding (*auto-genous,* as it is frequently termed) oxygen usually mixed with acetylene in a specially devised torch is generally employed. The combustion is easy of regulation and produces such intense heat as to instantly melt steel in the restricted area affected by the flame. It has such interesting features peculiar to steel foundry operations that it justifies some discussion. In electric welding, the voltage, which must be lower than that generated in industrial power plants, was formerly stepped down by water-barrel rheostats or resistance grids. The modern economical method is to install a motor-generator set or a rotary transformer delivering direct current of 60 to 100 volts. The carbon electrode in the operator's hand must be the negative pole, the anode being in contact with the casting. Heat generated is in proportion to amperage, which may be as low as 400 and as high as 800 varying with the work. Bernardos originated this application of electricity in the '80's, incidentally performing a signal service to steel works, where it may almost be said to be restricted through adaptability.

Both gas and arc welding require the use of "soldering rods" to supply the void in the casting caused by the defect and enlarged by the flow of surrounding melted metal. Many experiments indicate that the best results are obtained by using for new metal rods of the same composition as that of which the welded object consists. Various elements have been experimented with to counteract the oxidizing effect of the flame, but it is a seemingly impossible task to prevent the oxidation of any element to supply a deficiency when that deficiency exists because of the high temperature to which the addition must be subjected. The writer, experimenting with 10 per cent manganese steel "soldering rods" produced such a violent oxidation under the arc that fusion was impossible until the manganese was burned out.

If welding could be performed in a confined space, from which air were excluded, the analysis and physical characteristics of the metal in the resultant weld would not vary appreciably from those belonging to the casting proper. It is the presence of oxygen in the atmosphere which changes the composition, and correspondingly the physical properties. It is impossible to prevent oxidation of some carbon, manganese and silicon for the period that the metal is at a molten temperature, whatever the source. Hence the claims made for some of the many welding methods can be seen to be extravagant. The efficiency of the operation (determined nicely by pulling turned normal and butt-welded sections) depends largely on the presence in the object to which the weld was applied of those elements which impart strength under tension, and which are subject to oxidation when steel is liquid. Naturally the skill of the operator and the control of the melting agency play important parts. The writer in making many welding experiments with unannealed soft steel castings, neither preheated nor after-heated as a part of the welding operation, has found that arc-welds average close to 65 per cent of the tensile strength of the natural steel; that arc-welding with proper generating and controlling apparatus is very uniform; that arc-welding is not suited to very thin sections because of the difficulty of heating a very restricted area and the advisability of melting off as little of the good metal as possible; that gas-welds average about 60 per cent efficiency on tensile test; that gas-welds are not uniform, sometimes showing up very poorly, but on very rare occasions running as high as 85 per cent; that gas-welding is

(*Continued on page* 404*b*.)



To Save Fingers

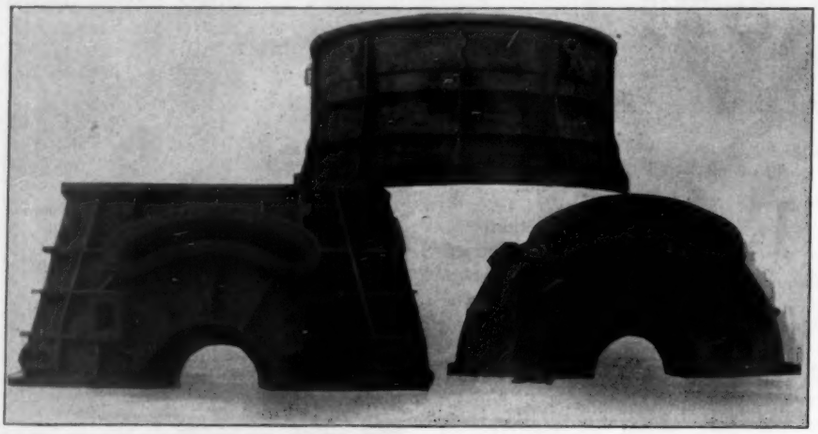
R. C. LEWIS of the Yale & Towne Mfg. Co., Stamford, Conn., has invented a punch press safety device of unusual merit, and instead of patenting it, the design has been dedicated to the public in the hope that its adoption may lead to a reduction in accidents in punch press shops. A bulletin has been issued by the Yale & Towne company describing the device and giving instructions for its construction. The punching press, in its various forms is probably responsible for as many industrial accidents as any other type of metal working machine and the importance of the use of safety devices on tools of this class cannot be over estimated.

The device designed by Mr. Lewis, which is illustrated in the accompanying photographs, can be installed in most cases at a cost of about $3 and with the exercise of a little ingenuity can be adapted to any style of press in use. As the illustrations indicate the device is attached by means of two studs which are ½-inch in diameter on each end. In setting up the device, after the studs have been screwed into the frame the vertical bars are placed on them; then a washer is placed over each and a cotter pin passed through the end of the stud to prevent the arm from working

(*Continued on page* 390.)

Making Turbine Castings

The Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., recently completed an order for five cast iron steam turbine castings for the Fore River Shipbuilding Co., Quincy, Mass. While the order required delivery within five weeks from date of receipt of the patterns, the last casting was shipped within 17 days. The castings were subject to inspection by the Argentine naval commission. The accompanying illustration shows three castings ready for shipment.



THREE TURBINES READY TO SHIP

Molding was begun on the first three castings on July 8 and they were cast six, eight and nine days later. These castings weighed 21,935 pounds, 29,930 pounds and 30,225 pounds, respectively. The last two castings were cast nine and eight days respectively, after the molding was begun. These weighed 32,415 pounds and 22,525 pounds.

The following table shows results obtained from test bars cast from each ladle:

Casting No.	Tensile strength lbs. per sq. in.	Transverse strength bars 1 in. sq.	Deflection, supports 1 ft. apart.
1	34,910	3,560	0.1562
	36,834	3,990	0.1718
2	37,627	3,880	0.1562
	36,223	3,680	0.1875
3	38,760	3,720	0.1875
	39,800	4,620	0.1400
4	35,500	3,490	0.1562
	38,917	3,530	0.1718
5	34,281	3,400	0.1562
	36,620	3,640	0.1875

Transverse bars cast 1 inch square and tested in the rough. Tensile bars cast one and one quarter inch in diameter and turned to a diameter of 0.750 inch.

The Coleman Foundry Equipment Co., 2102 Abbey avenue, Cleveland, recently organized, will engage in the manufacture of ovens, brass furnaces, aluminum furnaces and other equipment formerly built by the J. D. Smith Foundry Supply Co. The Coleman company purchased the patterns, patents and drawings formerly owned by the Smith company. The officers of the Coleman Foundry Equipment Co. follow: F. A. Coleman, president; D. S. Hawkins, vice president, and C. H. Frank, secretary and treasurer. These officers formerly occupied similar positions with the J. D. Smith Foundry Supply Co.

Threaded Pipe

Brief reference to the threaded cast iron pipe which is now being manufactured by James B. Clow & Sons, Chicago, was made in the last issue of THE IRON TRADE REVIEW. The threaded pipe is made exclusively at the Newcomerstown, Ohio, plant of the Clow company. The pipe is cast in pits like bell and spigot pipe, in 12-foot lengths and with the exception of the threaded couplings it is similar in all respects to the older form. The sections are plain, without bell or bead on the ends. They are made in a range of sizes from 3 to 12 inches in diameter.

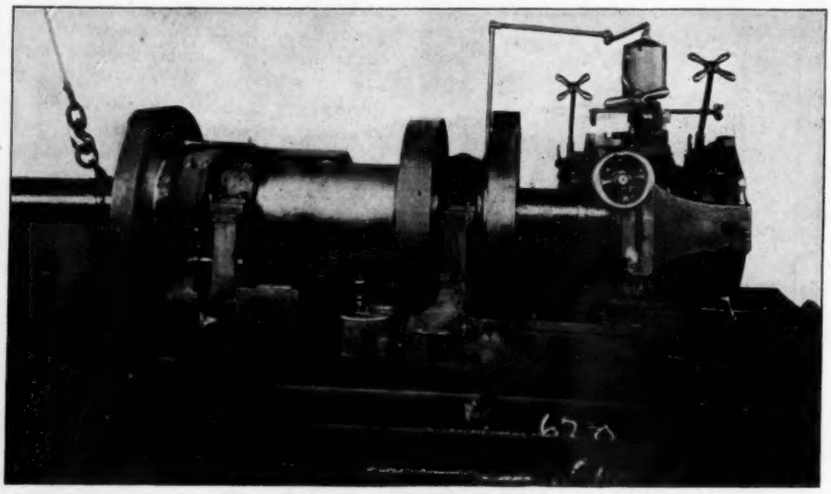
The thread is cut on a Saunders threading machine, specially designed for the purpose. A cutting tool in front of the die removes from the pipe surface the irregularities left in the casting pit and brings the pipe to a true diameter.

To avoid the difficulties which were previously met in attempts to make threaded cast iron pipe, the thread is of the United States Standard form instead of the Briggs standard used on wrought iron pipe. Eight threads are cut to the inch. The threads have the truncated wedge shape of the true United States standard form. No special devices are made use of in threading the pipe or the couplings, the result being attained entirely through the form of the thread.

The couplings are cast iron and are tapped on a machine which cuts the threads on both ends at the same time. The first half-inch is beveled and contains no threads, thus providing a bearing on the outside surface of the pipe and insuring a tight joint. A special form of coupling is provided for gas work where necessary, a recess being cut for half an inch, leaving a space between the coupling and the pipe which allows a cement seal. However, the rust joint formed between the threads in a few hours is ordinarily sufficient to seal the pipe effectually and render other means unnecessary.

A threaded flange is also manufactured which allows an easy means of providing odd lengths of flanged pipe without specially casting them. The flanges can be screwed on a section of threaded pipe of any length.

It is said that the use of this pipe gives a solid cast iron line capable of sustaining pressures up to 250 pounds without leakage.



CAST IRON PIPE THREADING MACHINE

The difference between carbon and alloy steels may be told by the sparks.

Peat—A Metallurgical Fuel?

Interesting Possibilities Suggested by Close Proximity of Enormous Peat Beds and Vast Deposits of Iron Ore in Minnesota

BY PETER CHRISTIANSON

ATTENTION is called to the possible uses of peat in connection with the iron ore industry, on account of the proximity of the peat and ore deposits in the Lake Superior district and the utilization of peat bogs which are usually regarded as waste areas. The subject naturally divides itself into two parts, beneficiation and smelting of iron ores.

Beneficiation is a term applied to the preliminary or preparatory treatment of ores, whereas, smelting is the final reduction of the ores. Blast furnace smelting is universally used in the reduction of iron ore. There are certain requirements necessary to make an iron ore suitable for the blast furnace process. It would be out of place to enumerate all these requirements and only the two most important will be given. The ores must contain a certain minimum of iron content. This minimum, in the Lake Superior district, is about 50 per cent "natural iron". Also the ores must have a certain physical structure without too much fine material. Large proportions of fines cause proportional losses of material as flue dust. The fines also obstruct the blast furnace gases, and this in turn hinders the smelting operations, reduces the production and increases the cost.

There is a large tonnage of iron bearing material which, though comparatively rich in iron, is not available as a source of iron because of a lack of one or more of these requirements. The object of beneficiation or concentration is to make this material valuable.

Peat a Low Grade Fuel

All concentration processes require power, which is usually derived from fuel. The fuel is utilized for both power and heating purposes. Peat is primarily a low grade fuel, which economically will not bear transportation. However, for power purposes the transportation problem of peat is not a serious obstacle.

A peat power plant should be located at the peat bog, and should consist of the following parts:

First.—A plant for producing machine peat.

Second.—A gas producer plant for gassifying the machine peat and making producer gas.

Third.—Gas engines coupled to electric generators—a combination which converts the producer gas into electrical energy.

By this scheme the peat is converted at the bog into electrical energy, which may be conducted without undue loss to any reasonable distance and utilized as power at the concentration plant.

Peat for Heating Purposes

Drying, roasting, calcining and sintering operations are becoming more and more important. Taken collectively it may be said that these operations are partly for concentration and partly for physical betterment of ores. Of these operations, drying requires the lowest temperature and sintering the highest, while roasting requires an intermediate temperature together with a regulation of the furnace atmosphere. There is no inherent reason why peat could not be utilized as a fuel in all these operations; and the proximity in many places of the peat and ore deposits makes this seem reasonable as a commercial proposition.

The type of furnace used for drying or roasting is a horizontal slightly inclined revolving cylinder, with a stationary combustion chamber at one end. The fuel generally used is coal burned on an ordinary grate. Machine peat could readily take the place of coal, but it should be noted that the heating power of peat is only about one-half that of good soft coal. Therefore, the grate area necessary for doing a given amount of work must be nearly twice as large for peat as for coal.

This method of burning peat requires the simplest preparation of the fuel. In fact, its preparation is identical with that used in preparing peat for power purposes. Hence the same peat plant, if of sufficient capacity, will serve both for power and heating purposes.

A method of burning peat in a powdered form has recently been perfected. It is being used in Sweden for firing locomotive boilers, and is easily adapted to the firing of the cylindrical furnace used for drying, roasting or calcining. In fact, this method of using powdered fuel was first applied to the horizontal cylindrical type of furnace.

The cost of preparing peat in a powdered form is fully twice as much as that of producing machine peat. However, the use of powdered fuel is more economical and a higher temperature is obtainable. Hence for high temperature operations, such as roasting, calcining and sintering, it may be advantageous to use peat in this form.

Still another method of using peat for heating purposes is that of making it into producer gas and then burning this gas in furnaces used for drying, roasting or sintering purposes. For example, in one process, the fine ore is first made into briquettes. These briquettes are ignited at a very high temperature in a furnace characterizing the process. The fuel used is producer gas burned on the recuperative principle. It is suggested that this producer gas be made from peat, provided a suitable supply is located near the briquetting plant.

The purpose of agglomeration is to render finely divided ore lumpy or massive. This finely divided ore may be in the natural condition, or it may be the result of a concentration process. It is rich enough in iron to qualify as an ore, but on account of its finely divided condition, does not possess the requisite physical structure. There is a considerable tonnage of finely divided rich ore on the Mesabi range which belongs to this class. Also the concentrate which will result from the concentration of the low grade magnetic ore material on the eastern end of the range belongs to this class. The function of the agglomeration processes is to render these materials suitable for the blast furnace. Hence there is a large field of usefulness for these processes.

Pure or nearly pure iron oxide as it exists in a finely divided condition or as a concentrated product has no plasticity nor coherence. In order to agglomerate such material at ordinary

Portions of a paper read at the recent Duluth meeting of the American Peat Society. Dr. Christianson, the author, is a professor in the school of mines, University of Minnesota, Minneapolis.

temperature, it must be mixed with some binder to make the particles adhere in the form of a briquette. It is proposed to use peat for this purpose.

The plasticity and binding properties of peat are quite characteristic. This is particularly true of the best grade which is dark or nearly black in color. This grade of peat, containing about 75 per cent moisture, thoroughly macerated has an unctuous feel and will dry into a coherent mass which will stand considerable wear and tear before breaking into pieces. In fact, it is this binding property of peat which makes the manufacture of machine peat possible.

The writer recently made some experiments along this line at the Minnesota school of mines experiment station. Fine concentrates were mixed in varying proportions with peat containing 75 per cent moisture. These mixtures were made into briquettes in a manner similar to that used in the manufacture of machine peat. These briquettes contained 12½, 13¾ and 15 per cent of equivalent dry peat. All of them exhibited a rather remarkable degree of toughness and resistance to wear. If heated in an oxidizing atmosphere, the briquettes immediately crumble, but in a reducing atmosphere like that of a blast furnace they retain their shape quite persistently. The experimental data on this point, however, are not complete.

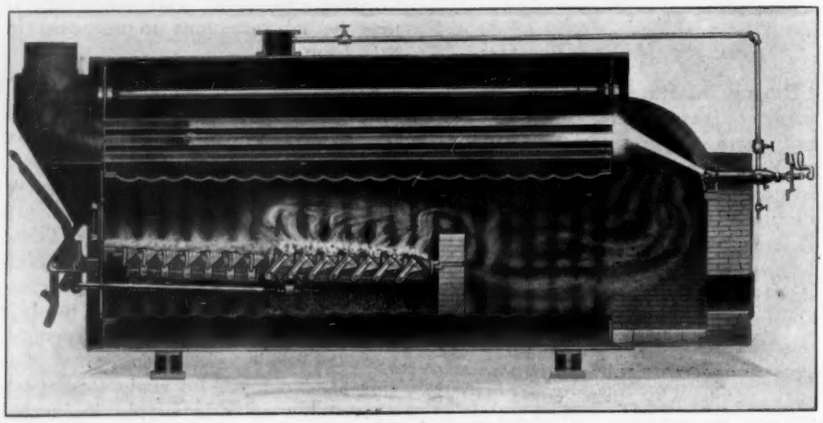
In order to determine the mechanical and physical properties of these ore-peat briquettes, a series of tests is being conducted by the writer at the Minnesota school of mines experiment station, the results of which will be published in the form of a bulletin.

The impurities introduced into the briquettes by the use of peat as a binder would be a minimum; first, on account of the small percentage of peat used, and second, because of the small percentage of impurities. The total foreign or slag-making constituents added in the binder, assuming 10 per cent ash in the peat and 15 per cent dry binder in the briquettes, would only be 1.5 per cent. Also, if it be assumed that the available carbon in dry peat equals 25 per cent, then 25 per cent of 15 per cent equals 3.4 per cent of the dry briquettes, which would be available for fuel purposes and tend to reduce the coke required for subsequent smelting. The cost of producing the briquettes would be about equivalent to that of making machine peat, since the machinery and manipulations would practically be the same.

Charcoal pig is especially adapted to certain kinds of castings, such as car wheels and chilled rolls. The hardwood of the Lake Superior region is rapidly being used up, and it will be only a comparatively few years before the present sources of charcoal will be gone; therefore, it is advisable to be on the lookout for something to take its place.

From the published analyses as well as from a few made at the experiment station, it does not appear that peat charcoal can take the place of wood charcoal in the production of charcoal pig as conducted at the present time. However, there is so much variation in the analyses of peat that each bog would have to be sampled and the samples analyzed in order to determine its probable value in this connection.

If peat could be made into a coke having the requisite hardness, there is no doubt that this coke could be used in the production of coke pig iron. It is only a question of making the peat into a suitable coke. There is a possibility that a smelting practice, intermediate between the present charcoal and coke, would be developed by the use of peat coke; and this might modify the resulting pig iron, so that it could take the place of the present charcoal pig.



ROCKING GRATE AND SOOT BLOWER INSTALLED IN AN INTERNAL FURNACE BOILER

New Rocking Grate

The tremendous waste of heat resulting from the usual method of cleaning fires in boilers by use of the slice bar and hoe through open doors has long been a matter of serious concern to engineers. To eliminate this waste, various types of shaking grates and mechanical stokers have been designed, among which the grate built by the Marion Machine, Foundry & Supply Co., Monadnock Building, Chicago, has taken a prominent place.

A typical installation of this grate in an internal furnace boiler is shown in the accompanying illustration. The grate may also be installed in the brick setting of an ordinary tubular boiler or in any other type of steam generating apparatus. The grate bars are of the interlocking type and the webs are extra deep to withstand the warping effects of the high heat in marine furnaces. The bars present considerable radiating surface which serves to preheat the incoming air. The spaces between the bars are proportioned to the type of boiler and the draft and are also so adjusted that it is impossible to dump sufficient cinders at one time to fill up the ash pit.

Each alternate bar rocks against a horizontal cam fitted to the side of the grate, which imparts a sliding motion resulting in a shearing action between adjacent bars that is said to effectually break up the clinkers. The amount of grate action is directly proportioned to the throw of the shaking lever at the front of the boiler. The shaking grate obviates the necessity for opening the furnace doors to clean fires and, therefore, materially improves the thermal efficiency of the boiler.

The accompanying illustration also shows a rotary soot blower manufactured by the Marion Machine, Foundry & Supply Co. It consists simply of a suitable nozzle connected to the steam supply of the boiler and so arranged that live steam may be blown into any of the tubes or flues at will. Where this device is installed in a boiler, it is possible to keep the flues clean all the time and it is not necessary to shut down for periodic cleaning, as is usually done.

In 1909 few competent authorities dared to assert that more than 50 per cent of the industrial accidents were preventable. Today we do not hesitate to say that from 75 per cent to 90 per cent are preventable.

A Combination Molding Machine

Heavy Duty Machine Designed to Perform all the Operations Connected With Making a Mold

AN interesting combination molding machine with several new features will be exhibited at the foundry convention in Chicago by the International Molding Machine Co., of Chicago. The machine is built in two styles, one being designed simply for turning over the mold and drawing the pattern and the other for performing jar ramming, turn-over and pattern drawing operations. The first or simpler form is shown in Fig. 1 and the combination jar-ramming, turn-over type in Figs. 2 and 3. A separate cylinder is provided for performing each operation which, it is claimed, insures a minimum consumption of air.

In the combination machine, the ramming section consists of a complete jarring machine built on a heavy one-piece base which extends the entire length of the machine The movement of the jarring piston is actuated by a gate valve located in the pipe line leading from the main air supply. The pressure can be regulated according to the length of stroke required for the weight of the mold. When the flask is being rammed, it is said that only the jarring section is subjected to vibration, as the jarring plate to which the pattern plate is fastened is entirely disconnected from other portions of the machine while it rests on the piston table. When the turn-over frame is lifted up to turn the mold over onto the receiving brackets, the jarring plate is automatically locked to the turn-over frame by means of studs connected to sliding levers.

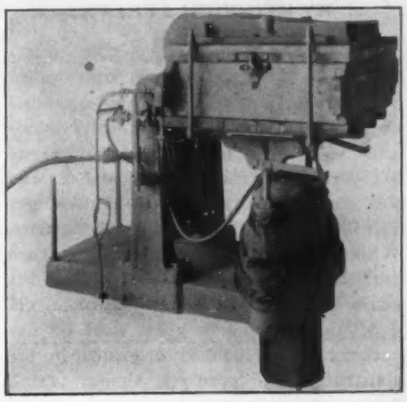


FIG. 1 — TURN-OVER MACHINE WITH FLASK RESTING ON RECEIVING BRACKETS

How the Flask is Turned Over

To turn the mold over, the valve leading to the center cylinder is opened. This forces the piston down, bringing with it the heavy piston rod that passes up through the cylinder cover and connects with a shaft which passes through the arms of the turn-over frame. The downward action of the piston rod causes the frame to raise, and when it has passed just beyond the perpendicular, the air is exhausted and the mold is lowered to a horizontal position. Air is then admitted to the drawing cylinder in order to raise the receiving bed up to the mold. The clamps then are removed and the air in the drawing cylinder is exhausted, lowering the mold away from the pattern. The height of the receiving brackets may be adjusted according to the depth of the flask. The draw of the machine is limited only by the movement of the drawing piston.

The stops which limit the movement of the turn-over frame when the mold is lowered preliminary to drawing are adjustable so that the proper angle can always be maintained between the plane of the frame and the drawing piston. These machines are built in several sizes and for very large work are provided with two or more turn-over cylinders. An automatic oiling system keeps all working parts properly lubricated. The machines are designed particularly for use in automobile shops and other foundries handling large quantities of duplicate work,, such as cylinders, crank cases, pistons, gear housings, water fittings, heavy engine parts, boiler doors, etc.

One of these machines was recently installed in a heating apparatus foundry, where it is used for molding 38-inch round sections. The output is said to be 35 flasks in four hours, using three men. When the same pattern is molded on the floor, it is said that three molders turned out 24 flasks in a similar time.

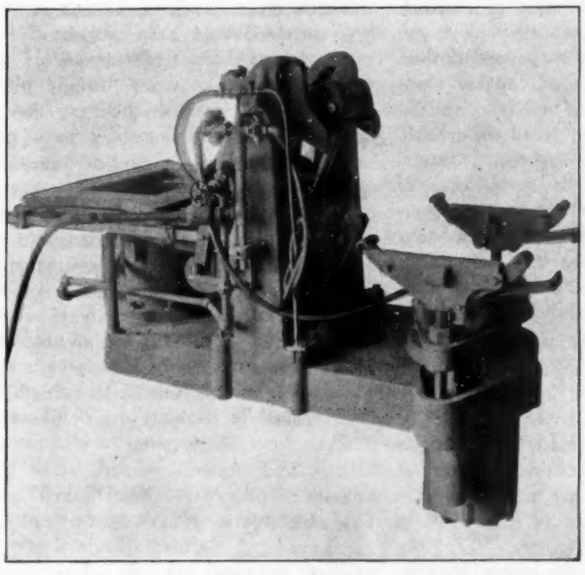


FIG. 2—COMBINATION MACHINE IN RAMMING POSITION

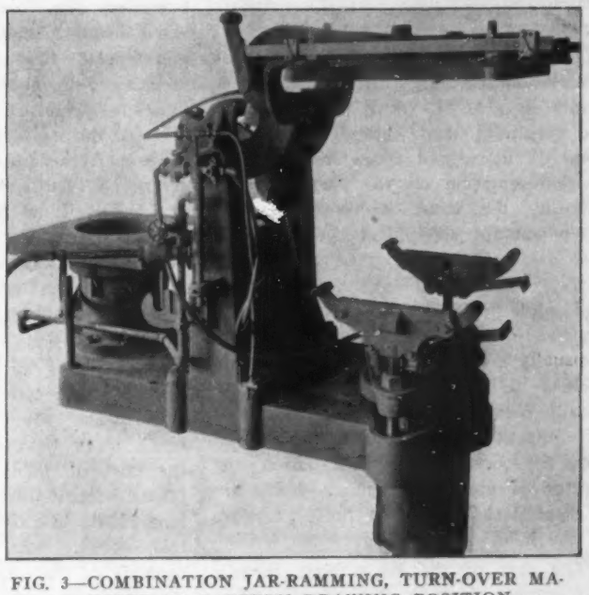


FIG. 3—COMBINATION JAR-RAMMING, TURN-OVER MACHINE IN PATTERN DRAWING POSITION

Gas Engines for Steel Plants

Conclusion of Mr Freyn's Arguments on Gas Engines vs Steam Turbines With Rejoinder by Mr Dyckerhoff

BY HEINRICH J FREYN

Concluded from THE IRON TRADE REVIEW, Aug. 20.

THE first cost of a blast furnace gas engine power plant of 27,000 kilowatt capacity maximum continuous rating at 700 pounds mean effective pressure including gas washing plant is not over $72.00 per kilowatt. The average cost of the same plant but with scavenging and surcharging system installed would, therefore, be less than $64.00 per kilowatt. The saving in first cost over that incurred if the 7,000 kilowatts additional capacity had been obtained by installing ordinary 4-cycle gas engines would be nearly $330,000 or practically $10.00 per kilowatt. This figure gives a fair idea of the importance of the new step in gas engine development from the standpoint of investment cost, but this is only one of the items to be considered. The principal and lasting gain would be made on account of the reduction in operating expenses. These can be calculated on the basis of actual operating costs of the Gary gas engine power plant for 1912 which were published in my aforementioned paper. The figures are given in Table I.

The saving in cost of producing electric power at the switchboard would, therefore, be 0.046c per kilowatt or at 180,000,000-kilowatt hours produced per year $83,000 annually. The investment in the scavenging and surcharging system in such a plant would thus be paid for in less than two years by the saving in cost of power production.

This brings up the question of cost of installation of blast furnace gas power plants in general, which together with the resulting fixed charges is another point of attack and frequently of much misrepresentation on the part of those favoring the cause of steam turbine equipment for steel plants. They insist that gas engine plants cost much more money than actual cost figures show and while they are quite ready to accept as of great value and significance unusually low investment costs in steam turbine and boiler plants which occasionally obtain owing to local conditions of competition, they refuse to acknowledge the correctness of installation cost figures of gas engine plants which are a great deal lower than those they are in the habit of assuming.

The cost of the latest blast furnace gas engine plant in this country completed about a year and a half ago, and of a capacity of 27,000 kilowatts maximum continuous rating is approximately $72 per kilowatt installed complete, and this figure covers even a modern gas cleaning plant of the required capacity. While this particular plant is perhaps particularly cheap in construction because it was built by an excellent organization, having a great deal of experience at its command gained in the construction of previous, similar installations, the difference between the actual installation cost of this plant and the figures claimed by gas engine opponents for plants of even much larger capacity is so great as to give prima facie evidence of considerable exaggeration. In certain cases, this difference is so great that it would pay, not only for the complete building, but also for gas engine foundations and the entire piping, with enough money left over to install a portion of the gas cleaning plant.

The cost of installation per kilowatt naturally increases with decreasing plant capacity, but in the light of our present experience, the investment in a blast furnace gas engine plant of 10,000 kilowatts would be only approximately $88 per kilowatt including gas washing plant. Frequently, both in this country and abroad, the cost of other equipment such as boilers, steam engines, steam turbines and condensers, storage batteries, distribution lines, etc., which were installed simultaneously with a gas engine plant of the same appropriation, is charged against the gas engine plant by those who are unfamiliar with the facts or do not care to go to the trouble of properly separating the cost accounts. It is not surprising if such methods are indulged in that the most inconsistent statements will appear in publications and this more than any other reason accounts for the great variation in first cost found in technical literature.

The cost of installation of steel mill turbine plants on the other hand is usually stated too low by steam power enthusiasts; their figures cannot be much more than estimates based upon the cost of public service corporation plants because there are no steam turbine plants in existence in steel mills in this country of anywhere near the capacity of the large gas power stations.

Cost figures of steam turbine plants in German steel works showing an investment of $31 per kilowatt nominal rating as published in *Stahl und Eisen* are by no means considered anywhere near "normal" even in Germany. This can be verified if subsequent critical discussion of this statement in *Stahl und Eisen* are consulted. The alleged "statistical" excess cost of installation of 40 to 60 per cent of German gas engine plants compared with steam turbine plants in that country may hold true in certain isolated cases, but the friends of the gas engine in Germany as well as manufacturers of both types of prime movers claim that the true ratio is 180 marks per horsepower for gas engine plants to 140 marks for steam turbine installations or 6.5 to 5, so that the excess cost of the former is not quite 30 per cent.

If a steel mill steam turbine plant of 50,000 kilowatt capacity in this country costs $55 per kilowatt, as is being claimed, the comparison with a steel mill gas engine power plant of similar capacity costing less than $72 per kilowatt installed will show the same ratio of approximately 1 : 1.3 or 30 per cent excess cost of the gas engine plant.

The use of the scavenging and surcharging system on gas engines, which today is an actual accomplishment, will change this ratio considerably in favor of the gas engine, especially since the introduction of surface combustion boilers—provided they ever will be a success—and of high steam pressures and high superheat in steam turbine plants are bound to increase the first cost of such future installations.

For lack of examples of favorable records extending over a long period of time of steel plant steam turbines, combined with blast furnace gas boilers, advocates on the steam turbine side of the controversy like to refer to the undoubtedly excellent record results of individual, comparatively short "show" tests of new steam turbines and coal fired boilers installed in German municipal power plants.

But they close their eyes to the simple and obvious consideration that results from carefully "tuned" acceptance tests, cannot very well be compared with those obtained as totals or averages of one whole year's operation in a blast furnace and

steel plant where operating conditions are so vastly different.

The practical blast furnace and steel man will be somewhat skeptical if he reads of an average yearly boiler efficiency of blast furnace gas-fired boilers of 76 per cent, while he is accustomed to using values of 60 to 65 per cent and be satisfied; he will not doubt that such test results are possible or have actually been obtained even with old boilers equipped with new burners, if such tests lasted only one hour, as those published by Ortman in *Stahl und Eisen*, 1913, but he will deduct several per cent from this figure when making his own calculations.

The remarkable progress of the steam turbine in recent years, especially in unit capacity and thermal efficiency unfortunately cannot benefit the steel mill power plant in the same degree as the central power station of public service corporations, because load conditions in the former are such as to make sub-division of the total plant capacity into a larger number of smaller units desirable. This subdivision, however, increases not only the investment, but also the operating expenses of steel mill turbine plants, not to mention the increase in heat consumption per kilowatt hour.

The question of the comparative thermal efficiency of steam turbine and gas engine plants receives the greatest attention in the discussions of Hoff's paper as well as in other publications, all of which are fraught with references to test results and guaranteed figures of both gas engine, steam turbine and boiler manufacturers covering the whole range of load from full to one-quarter load.

Great importance is being attached to the fact that the thermal efficiency of the gas engine is decreasing with decreasing load, while the steam turbine shows a sustained low steam consumption over a considerable range of load. From these premises, the conclusion is drawn that on account of influence of load and use factor in a steel plant which results in an average load of the power station considerably below its rated load, the steam turbine is in reality the more economical prime mover.

Much wrangling is done over this point, but it is being overlooked entirely that the fundamental conditions in blast furnace and coke oven power plants are wholly and distinctly different from those in central power stations where coal is used either for boiler firing or for gasification in gas producers.

The load factor and the average load in installations of public service corporations or industrial establishments, where coal is used, is of the greatest importance for the ultimate economy of the power plant, for that plant will be the most economical which at the end of one year or a number of years shows the smallest amount of money expended for coal, due consideration having, of course, been given to the other items which enter into the total cost of power production.

I venture to say that except in special cases, for instance with high-priced coal or if by-product recovery gas producers are used under certain favorable conditions, the coal-burning steam turbine and boiler combination will out-rival its competitors, especially if a demand exists for low pressure steam for heating or manufacturing purposes.

But in blast furnaces and coking plants, where a given quantity of so-called "waste gases" is generated more or less regularly irrespective of the power demand of the steel works and other consumers, the question arises: How much power can be generated in the power plant by utilizing these surplus gases, and these surplus gases alone without having to buy and ship into the plant any coal except coking coals?

This is the crux of the situation and it is evident that a blast furnace plant must hold at the disposition of the power station a certain quantity of gas fuel to take care of the maximum power demand irrespective of the fact that the power plant frequently operates at fractional load so that varying quantities of the gas are being wasted. The value of any commodity of whatever nature is governed by the law of supply and demand; if there is no demand for a certain commodity, it has no commercial value and blast furnace or coke oven gas make no exception of this rule.

If the surplus gas generated by a certain number of blast furnace or coke ovens just suffices for the maximum requirements of a steel plant, as is rapidly becoming the case in modern steel plants with the constantly increasing use of electric power for different purposes, then this quantity of gas must be reserved for the power plant and it would not be wise or practical to assign portions of this surplus gas to some other temporary use, simply because at times of fractional load, portions of this gas must be allowed to go to waste. These portions, therefore, to all practical intents and purposes have no intrinsic value in a steel plant since at present the storing of blast furnace gas at least is impracticable.

The coal pile in the power plant of a public service corporation or in a manufacturing establishment has to be purchased with good money and the longer it lasts, the better, because it affords means of storing fuel for future use; but blast furnace and coke oven gases are immovable sources of energy springing forth and being renewed continually—in a sense analogous to water power—but losing their value instantly if not harnessed and transformed into work.

In the light of this reasoning, it is obviously of questionable expedience to adhere to the present practice of assigning a definite value to the total quantity of surplus gas produced and of charging the power station for fuel consumed according to the thermal efficiency of the prime mover at whatever load factor or use factor prevails in the plant. At best, this is a method of bookkeeping

Table I

COST OF PRODUCING ELECTRIC POWER IN GAS ENGINE STATION OF 34,000 KILOWATT CAPACITY.

Item.	With ordinary gas engines.	With scavenging and supercharging system
Plant capacity in kilowatts	34,000	34,000
Use factor (assumed), per cent	60	60
Kilowatt-hours produced per year	180,000,000	180,000,000
Cost of installation per kilowatt	$74.00	$64.00
Operating expenses, cents per kilowatt-hour:		
Labor	.030	.026
Repairs and maintenance	.026	.026
Lubricants	.008	.007
Water	.004	.003
Miscellaneous	.012	.010
Total net operating expenses	.080	.072
Cost of purified gas	.160	.150
Operation without fixed charges	.240	.222
Fixed charges at 15 per cent	.208	.180
Grand total cost at switchboard, cents per kilowatt-hour	.448	.402

translated from the coal consuming power plant and applied by force of habit to a commodity which logically should be treated differently.

A given quantity of surplus blast furnace gas will produce in gas engines a certain maximum amount of power varying from 18 to 24 kilowatts per ton of pig iron produced in 24 hours, according to coke consumption, type of blowing equipment, etc. A blast furnace plant producing 3,600 tons of pig iron daily will produce enough gas to operate a power station of 68,000 to 70,000 kilowatts, and this is the actual capacity of the gas engine power stations at Gary.

If boilers and steam turbines had been installed in this plant, the same quantity of surplus gas could produce about one-half of this power demand. Whether the exact ratio is 1:2 or 1:1.7 is of little consequence, as I have shown in my paper published in the year book for 1913 of the American Iron and Steel Institute. In any event, large tonnages of outside steam coal would have to be purchased simply because the available surplus blast furnace gas was not utilized in the most economical manner. I am fully convinced, however—and reference to the discussion of Hoff's paper in *Stahl und Eisen* will bear me out—that the ratio of 1:2 will hold true in actual practice on account of the many chances for efficiency losses in steel mill boiler and steam turbine plants, the cardinal one being the frequent difficulty of burning the gas under boilers which is becoming more and more pronounced with reduced coke consumption and the ensuing poorer gas quality. The stoking of coal by hand on auxiliary grates of gas fired boilers is, however, at least a rather uneconomical makeshift, not only on account of the lack of expert firemen in such emergencies.

An abundant array of actual and hypothetical efficiency figures, investment costs and operating expenses of all descriptions pertaining to steam turbines and gas engines will be found in contemporaneous publications and it seems to be only a matter of proper selection of the most convenient figures and of a little arithmetic to prove in black on white most any desired result. It is another question, of course, how much practical value can be assigned to such calculations.

It is quite evident that in isolated blast furnace plants without steel works or where arrangements for the sale of power to outside consumers cannot be made, no value can be placed on the surplus gas which escapes unused through the bleeders. In such rare cases, the gas engine has, of course, no chances at all and the cheapest kind of steam equipment both for blowing furnaces and for generating the small amount of electric power used in the plant is entirely adequate.

I have mentioned before that in the struggle for supremacy in blast furnace and steel plants between gas engines and steam turbines, the latter are frequently credited with achievements which often lie in the distant future. Frequent mention is made of the "incandescent surface combustion" boiler of the Bone-Schnabel type which is claimed to have shown average efficiencies of 93 per cent. It will be interesting in this connection to refer to two recent articles on the subject which appeared in *Stahl und Eisen* No. 47, 1913, and No. 14, 1914. In the former the author, G. Neumann, arrives at the conclusion that "the advantage of the high gross efficiency of Bone-Schnabel boilers is reduced and even reversed by the high power consumption of the flue gas fan. Economic considerations and questions of design tend to make the situation only more unfavorable. The load regulation on Bone-Schnabel boilers seems difficult."

In the second article, O. Dobbelstein discusses the results obtained with Bone-Schnabel boilers built for the Krupp works at Essen operating on coke oven gas and tar oil. The author gives detailed results of tests made on these boilers and describes the difficulties which were encountered in operation. It appears that the refractory filling of the tubes sintered on account of local high temperatures and became clogged after three weeks of operation. The high evaporation per square foot of heating surface could not be maintained in practice and the efficiency did not come up to expectations. The cost of installation of such boilers was found to be materially higher than that of coal-fired boilers. There was also a great deal of corrosion of the tubes on account of the sulphur in the gas and the author concludes that "surface combustion boilers in their present form are not suitable for commercial operation."

In view of these latest developments, it seems somewhat premature to expect realization of the high thermal efficiency of surface combustion boiler and steam turbine combinations for blast furnace plants and collieries.

It would be unjust to deny that the steam turbine can be a very valuable adjunct to a steel mill gas power plant to take care of peak loads and to be held in reserve; attention is again directed in this connection to the splendid results obtained at the Cockerill Works and elsewhere with exhaust heat boilers attached to gas engines and to the utilization of the steam thus generated for operating steam turbines. If both gas blowing engines and gas electric engines are equipped with exhaust heat boilers as much as 18 to 20 per cent of the installed gas electric station capacity can be generated in steam turbines which would operate in parallel with the gas power plant and assist in carrying the peak loads without additional fuel expense.

Power Questions in Steel Mills

A REJOINDER BY A. DYCKERHOFF

IN THE article, "Gas Engines for Steel Plants", H. J. Freyn has referred to my paper on "Power Questions in Steel Mills" which appeared in THE IRON TRADE REVIEW, July 2 and 16. He discusses some of the points raised therein from the standpoint of the gas engine advocate. One of my intentions was to demonstrate that the steam turbine driven generating units have a right to existence in steel mill power plants and can at least demand a fair consideration which is very frequently denied them. While he has made reference to other publications, I will confine myself to a rejoinder to mainly those points of my article which I think have been distorted.

A paper by Mr. Hoff has been cited which deals considerably with the question of steam roll drive and electric drive and of the generation of electric power. If one does not want to split hairs, it may be said that the revised table of Mr. Hoff does not show a material change from the original table, making a modification of his conclusions to a very large extent unnecessary. It must be conceded, at least by impartial parties who have followed this subject up to the present, that a good many of his conclusions are supported by known engineers who have no "ax to grind."

The author of the discussion "Gas

Engines in Steel Plants" drops back to the old fault of disregarding the conditions of connected electrical machinery. He cites a number of plants abroad where additions to the equipment were made in the form of gas engines without, however, mentioning the particular conditions. For instance, one of these plants has a large fly wheel set feeding direct current roll motors and has a few alternating current roll motors: a second one has installed an Ilgner set feeding a reversing mill and a direct current roll motor, and also has in service alternating current roll motors and a turbine; a third one has a turbine on the line; and a fourth one has electrically driven reversing mills and a turbine. Some of those cited have no roll train load at all.

Further, he states that the question of "difficulty of regulation" and the resulting troubles of parallel operation has been brought up too often. While the degree of perfection of regulation does not need to come up to that of a public service corporation, the importance of this point must be considered when electric energy is sold to outside parties, particularly at the prevailing frequency of 25 cycles. Otherwise the lighting service may become unbearable. If investigations are made as to the regulation of steel mill power systems with roll train service and the facts stated it should be mentioned that generally a regulation "beyond reproach" is mainly effected by a certain added amount of turbine capacity or by a high installed capacity of generating units. With reference to the general statement that "all gas engines regulate badly and make parallel operations some times impossible" it must be said that such a general sense is not contained in my paper.

Local Conditions Must Be Considered

It is self-evident that local conditions at different mills must influence the various factors depending on certain circumstances such as types of roll trains, stock rolled, grouping and combination of energy demands, etc. Naturally, in making a comparison of factors of various plants the periods of prosperity and depression in the steel business will have to be considered. If such specific references are not given a comparison proves deceptive. Many gas engine advocates do not consider sufficiently the higher fixed charges of gas engine power plants in times of depression as compared with turbine plants.

It can be conceded that it is a difficult problem to arrive at an understanding of the term "rating." In some public service corporations there are applied maximum rated generating units, so that the rating of the plant, excluding proper reserve, corresponds to the maximum demand on the line as if it occurred continuously. The maximum demand occurs only on certain days in winter and the load conditions at any time are accurately foreseen. The conditions in steel mill power plants, however, are different. The maximum energy demand under normal operation may come on at any time, but will usually last only for a short period. Consequently, the time element must enter such considerations of rating as is known by those familiar with roll train loads.

Difference in Cost

A first cost of $72 per kilowatt is given for a gas engine power plant of 27,000 kilowatt capacity while in a former paper $87.50 per kilowatt (21.5 per cent higher) is stated for a power plant 32.5 per cent larger. Attention is called to a paper by F. M. Farwell (*Electrical World*, No. 5, 1912) in which the costs per kilowatt of moderate size alternating current stations are figured as $130 per kilowatt for the blast furnace gas engine and as $80 per kilowatt for the high pressure turbine plant, with the result that the gas engine plant is 62.5 per cent more expensive than the steam turbine plant. This gives a fair confirmation of the statement that blast furnace gas engine power plants are from 40 to 60 per cent more expensive than turbine plants as based on Continental systems. A man in a responsible position with a continental manufacturer of gas engines and steam turbines stated: "Generally in average sized plants the gas engine equipment is about 50 per cent more expensive than the turbine equipment."

It is perfectly proper to make estimates from first costs of public service corporations and other plants under consideration of particular conditions. If the investment cost of $31 per kilowatt (90 marks per brake horsepower) is doubted, attention is drawn to a statement in *Stahl und Eisen*, No. 51, 1913, in which this sum is verified as "normal." In the same contribution an investment cost of 200 marks per brake horsepower is considered a proper charge for an entirely new gas engine power plant and 220 marks per brake horsepower for a plant to be fully completed in the course of time. These figures give a still greater excess in first cost than 40 to 60 per cent.

The "undoubtedly excellent record results" of individual new steam turbine plants even if obtained by coal-fired boilers, permit a ready conclusion to be drawn for new and well managed gas-fired boiler plants. That tests cannot be "tuned" for periods from one to five years is beyond possibility. In this connection similar figures as given in my Table V are available in this country. See the appendix of Richard H. Rice's paper on "Turbo Blowers for Blast Furnace Blowing" presented in the May *Journal* of the American Institute of Mining Engineers.

A full load efficiency of 82 to 83 per cent of a new coal-fired boiler is now practically a standard in Continental and American plants. As to gas-fired boilers, Ortmann, consulting engineer of a well known Continental steel plant, recommends an operating efficiency of at least 78 per cent (*Stahl und Eisen*, No. 46, 1913) and announces that the latest guarantees of such boilers are 89 per cent.

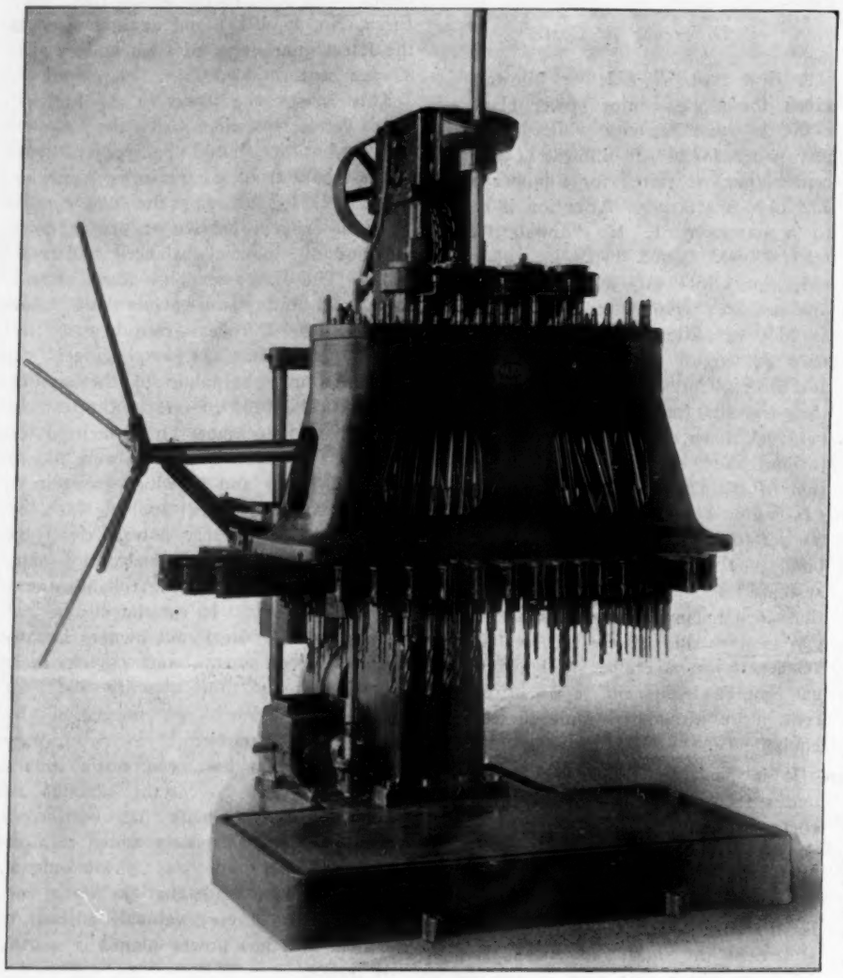
This is not the place to go further into detail questions of the power plants, but it should be pointed out again that true comparisons can be made only by including the load conditions in order to arrive at proper conclusions of financial balances and service. The fact remains that several new steel mill power plants have been built on the European continent to the entire exclusion of gas engines. A reference may be made to the annual report (1912-1913) of one of the leading makers of machinery in which it is stated: "The steel mill power plants supplied by us and in which steam turbines exclusively are applied for the generation of electric power, excel by good thermal economy, also by simplicity, increased operating reliability and low first costs." It can hardly be assumed that the steel mill owners installing such equipments and paying their "good money" are guilty of an "economic crime" or misguided by fictitious "arithmetic."

No objection has been made to the statement that a certain amount of steam turbine capacity has been very frequently and purposely added to Continental steel mill gas power plants. The concession made that the steam turbine can be "a very valuable adjunct to a steel mill gas power plant" is worthy of notice.

Several new trade publications recently have been issued by Joseph T. Ryerson & Son, Chicago. An 84-page booklet on internal furnace boilers is included in this group of new publications. It covers the subject of internal furnace or marine type boilers thoroughly and contains considerable valuable data. Joseph T. Ryerson & Son also have recently issued a booklet on concrete reinforcing which contains a number of valuable tables, together with new bulletins describing the Ryerson high-speed friction saw and the Lennox serpentine shear.

Multiple Spindle Drill

The National Automatic Tool Co., Richmond, Ind., recently has added to its line of multiple spindle drills, the machine shown in the accompanying illustration. This drill is designed to carry a large number of adjustable spindles over a large drilling area, and is particularly adapted for drilling automobile crank cases and similar work. The machine can carry from two to 44 adjustable spindles, or equipped with cluster boxes can carry from two to 90 spindles. The machine illustrated was furnished to a motor manufacturer for drilling six cylinder crank cases in one operation.



MULTIPLE SPINDLE DRILL

A single pulley drive is employed. Any one of the three available speed changes can be obtained by shifting the hand lever. There are three independent drill feeds.

The bronze bearings which carry the drill spindles are provided with a vertical adjustment to compensate for the variation in drill lengths. This adjustment is readily secured by loosening a nut which is always accessible regardless of how closely the spindles may be clustered together. This spindle adjustment which is a patented construction, holds the bearing rigidly to the end of the arm.

The machine is mounted on a heavy base which is provided with an oil channel for catching the over-flow. The column is of heavy construction. The spindles are provided with small thrust bearings at the lower end and locknuts at the upper end.

An unusual feature of this machine is the independent drill speed in the head which gives two independent changes of speed to each spindle for each of the three changes of speed obtained in the gear box. This permits the drilling of large and small holes simultaneously at correct cutting speeds.

For example, when using a ½-inch or 1-inch drill in cast iron it is possible to secure a speed of 4.72 inches per minute. For this purpose the speed box lever is shifted to the point that gives 547 revolutions per minute or 71.5 feet per minute as the peripheral speed of the ½-inch drills, which are fed 0.0086 inch per revolution. By shifting the driving pinion in the head which drives the 1-inch drills, these can be driven at 271 revolutions per minute or 71 feet per minute with a feed per revolution of 0.0174 inch. Thus the peripheral velocity of the drills in feet per revolution is practically constant while the feed of the ½-inch drills is only one-half as great as that of the 1-inch drills.

To Save Fingers

(*Continued from page* 381.)

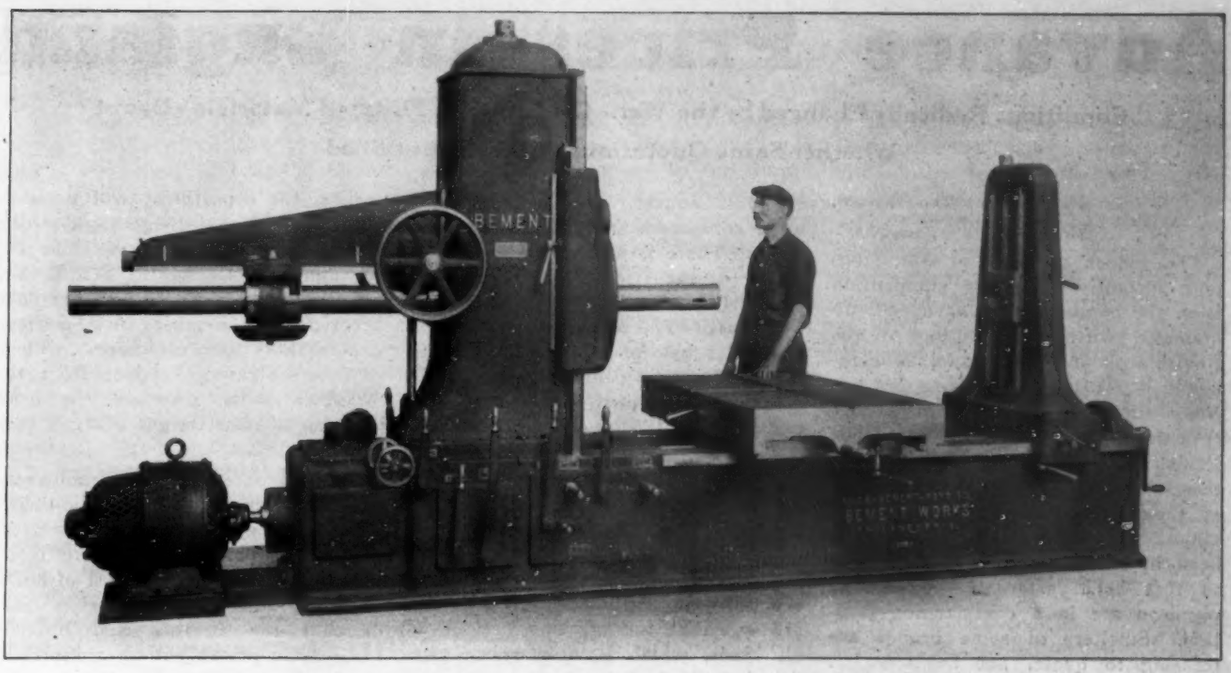
off. A horizontal bar is permanently fastened to one of the vertical bars by a shoulder rivet in such a manner as to allow free action between the bars. This horizontal bar is connected to the other vertical bar by means of a cut in the end which hooks onto the body of the shoulder rivet. It is corrugated on the front side and has holes for the purpose of allowing the adjustable vertical bar to be placed in different positions. The bars are all made from machinery steel 1⅛ inches wide and $\frac{3}{16}$-inch thick. A corrugated vertical guard bar, which is attached to the corrugated horizontal bar, may be adjusted either vertically or horizontally.

Fig. 2 shows how the device is adjusted to an ordinary bench press. The operator has just placed the material to be stamped in the nest and is about to press the treadle in order to release the clutch. If the resistance of his hand against the felt pad, which is attached to the vertical guard bar, is greater than the pressure of foot on the treadle the clutch cannot be released.

In Fig. 3, the hand is shown pushed aside by the felt pad before the locking pin has engaged the fly wheel. The pin is engaged by the movement of the rod which is shown at the right hand side of the press. This rod is attached directly to the foot treadle..

It often occurs that the same press will be used for several different operations in one day. The height and width of the punches and dies may vary in each of these operations and it is important in trying to make a machine safe, that the productive power of the operator be not lessened. Fig. 4 shows how easily this device may be disconnected and adjusted. A piece worker will cease to use a safety device which takes any appreciable amount of time to readjust.

Bulletin No. 188 and Bulletin No. 189, recently issued by the Bristol Co., Waterbury, Conn., describe three types of recording differential pressure gages and recording flow-rate meters manufactured by this concern. The mechanism of each of the instruments is fully described and the bulletins are profusely illustrated by half-tone plates and line engravings.



Duplex Control, Horizontal Borer, Driller and Miller

A New Borer, Driller and Miller

The Spindle Saddle is Inside the Post and the Machine Has Other Unusual Features

THE Niles-Bement-Pond Co., New York, recently has developed the horizontal borer, driller and miller shown in the accompanying illustration. This machine is of the elevating spindle type and is designed for heavy boring. The operator can stand on either side and have all the controlling levers within convenient reach.

An unusual feature of the design is the location of the spindle saddle within the post. This permits symmetrical construction about the spindle axis and affords a rigid support for the spindle. The thrust is taken on two V-tracks, one on each side of the spindle, eliminating distorting strain. The spindle saddle has vertical power feeds for milling and also rapid power traverse.

The spindle column is of box form, strengthened inside by ribs. The V-tracks for the saddle traverse are planed on the front of the column and have unequal sides. The broad faces toward the outside of the column present a liberal bearing surface for the saddle, while the faces toward the inside are approximately at right angles to the others for resisting side thrusts.

The following power feeds are provided: Horizontal feed of the spindle, suitable for boring and drilling; vertical feed of the spindle saddle and cross feed of the table for milling. In addition, automatic feed may be provided for circular motion of standard table or in connection with a round table.

The bed is a cored-out box casting, wide at the top and presenting a liberal surface for the table saddle bearing. Broad flanges at the bottom and inside cross rib braces make the bed of rigid construction. The driving, feed and traverse gears are located inside the bed; the driving gears run in an oil bath and the feed and traverse gears are lubricated by the splash system. A facing head may be attached either to the face plate gear or fastened on the boring bar.

The general dimensions are as follows:

Table	33 x 60 inches
Travel across machines	48 inches
Spindle, diameter	4½ inches
Spindle, diameter of taper hole at large end	3 inches
Spindle, traverse	60 inches
Maximum distance from center of spindle to standard work table	30 inches
Maximum distance between face plate and outboard bearing	84 inches

The drive is furnished by a direct current variable speed motor of three to one range. While this drive is preferable, the machine also may be furnished with the following drives: Cone and counter, single pulley through speed box, multi-speed or constant speed alternating current motor through speed box.

Preventing Fires

The conflagration at Salem, Mass., on June 5, in which $15,000,000 worth of property was destroyed, is another striking example of the destruction which so often follows the breaking-out of a fire among building constructed and roofed with inflammable materials. In 1912 Paterson, N. J., had a similar disastrous fire experience. Subsequently, however, the city of Paterson passed an ordinance prohibiting the use of wooden shingles or inflammable roof coverings within the city limits and since that time, in Paterson and its immediate suburbs, more than 2,000 roofs have been covered with asbestos shingles and roofing manufactured by the H. W. Johns-Manville Co., New York City. The efficiency of asbestos roofing as a fire stop is illustrated by the fact that in the Salem fire sparks and burning embers were literally showered upon the roof of the Naumkeag Steam Cotton Co.'s storehouse, yet this building was absolutely unharmed because it was protected by Johns-Manville asbestos roofing, while other buildings burned to the ground.

Advance Prices in England

Conditions Radically Changed by the War—Confusion in Finished Materials—Doubt Whether Same Quotations Will be Maintained

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., Aug. 14.

The sudden outbreak of war, stopping instantly the fierce competition from the continent, has changed with dramatic swiftness the outlook of the British iron and steel trade. The rebound is all the more violent because competition has never been keener than during the past few months. The British makers suddenly have found themselves in undisputed possession of their trade. The effect has been almost electric. There has never been in Birmingham such a meeting as that held yesterday. Makers of pig iron are in a commanding position. Smelters of some brands are refusing to quote, but business has been done in most lines at large increases on ante-war prices. It is remarkable that prices in the Midland district have advanced three times more than in the north of England. The latest Cleveland quotations range about 53s ($12.98) with stocks standing at 87,000 tons. At these prices very good sales have been made. But in the Midland district, prices have run away and smelters have obtained without difficulty advances of 6s ($1.44) to 7s ($1.70), several of them having added 2s 6d (60c) to 5s ($1.22) on last week's quotations. One large firm in the Midlands quoted 70s ($17.14) for Staffordshire iron representing a rise of quite 10s ($2.44) per ton. The position of the smelters has been strengthened somewhat by applications from makers of war material, who are quite ready to pay higher prices than other people.

Several holders of blown out furnaces are getting ready to light up, prices having now become profitable with a good demand. Buyers are showing great anxiety to secure themselves for the future. A significant advance was that of 5s ($1.22) in East Coast hematite pig iron declared yesterday, making the selling figure 70s ($17.14) per ton. Stocks are everywhere so small that consumers have been caught unprepared. Makers are resolved to sell as little iron as they can under present circumstances. This is not, however, an altogether unanimous view, as it is doubtful to what extent the present rise may be counterbalanced by the general falling off in trade, which most people look forward to as a result of the war, in the event of its being prolonged. Several leading furnaces declined to consider new business, and some consumers are in a difficult position. There is still doubt as to the reality of the rise, the market being obviously under the influence of the war scare. The smelters are assisted somewhat by the comparative steadiness of fuel, the panic buying of coal having already spent itself. The makers of special high-class brands requiring such alloys as tungsten and manganese are very much concerned over the prospect of a famine in these materials resulting from the war. Prices have been rushed up rapidly and stocks happen to be very low, especially in Sheffield. These alloys are essential for armament steel of all kinds, which is now being produced at high pressure.

Confusion in Finished Lines

In the finished department the war has produced a state of confusion. Prices generally have gone up with a bound, and the owners of works self-contained and able to furnish their own materials are naturally elated. Without exception they have advanced their prices and booked enough business to insure activity for the rest of the year.

The case is very different with those finishing mills dependent for years past upon the cheaper billets, bars and rods which they have been able to obtain from the continent. Purchases in these lines have been unusually heavy this year, especially at the spring quarterly meeting when Belgium and Germany were apparently eager to sell, almost regardless of price. Some of these contracts were renewed at the July meeting, and practically all of them had still some months to run. The outbreak of war closed up every contract. Buyers of wire rods were placed in a very difficult position. A typical example is that of a large Birmingham wiredrawer who was buying rods at £5 5s 5d ($25.72) per ton, and has now been obliged to revert for supplies to British firms whose lowest quotations are £8 ($39.18) per ton. At this price for material his wire sales will involve him in a heavy loss. The wiremakers are very much embarrassed, and one of them has suggested to the board of trade the legalizing of contract suspensions at fixed prices during the continuance of the war. While this step is approved, the makers are not very hopeful that the government department will do anything so drastic, although some strong measures have been taken since the beginning of the war. Within the last day or two the wiremakers have directed their inquiries to American steel makers and merchants, with a view to obtaining supplies from the American mills, provided the price is all right after freight charges have been met.

Finished steel has been advanced £1 ($4.88) per ton and very good sales have been made, but there again great uncertainty prevails and there is an uneasy feeling that the arrest of building and structural enterprises may discount the advance and possibly force down prices, but for the present the makers are disposed to enjoy and make the most of the rare luxury of the monopoly of the home steel market. Scotland, at any rate, is having a fine boom time through the stoppage of the enormous shipments of German ship plates, which in the early part of the year so completely upset its trade. Its elation, however, is moderated by the certainty of a reduced demand for commercial shipping as the result of the war on the trade of the world.

Advances in finished prices of iron have covered every department. Mild steel wire has been advanced £2 ($9.78) per ton, making the new price £9 15s ($47.74). Even with this large increase those wire drawers who happen to have low stocks of rods will sell at a loss.

Marked iron has been advanced from £8 10s ($41.62) to £9 ($35.50), unmarked bars, £6 10s ($31.86) to £7 15s ($38), and gas strip from £6 5s ($30.60) to £7 5s ($35.48). This was another severely cut line before the outbreak of the war. The tube-makers who were buying German material at cheap rates will be badly hit by this increase, but they are hoping to appropriate a fair proportion of Germany's tube trade.

The galvanized sheet trade has been brought almost to a state of suspense by the scarcity of spelter. A great deal of this comes from Silesia, and the world's distribution mostly takes place through Antwerp. Scarcely any maker will quote for galvanized sheets, spelter having advanced from £25 ($122.44) to £35 ($171.42) per ton, but such business as has been done has been round about the basis of £15, and in some cases £14

($68.40) has been paid. Most branches of the iron and steel trades look for animated business for some months to come.

A doleful exception is the Welsh tinplate trade, which has been completely stagnated. During the August bank holiday week, 500 mills were idle, and very few of these have resumed this week. The trade has scarcely recovered from the Balkan war and now the whole of its eastern business is swept away at a stroke. It is hoped that when the safety of shipping is insured, a certain amount of business with the colonial and South American markets may be found possible.

To counterbalance other war losses, large quantities of bedstead strip are being called for the manufacture of bedsteads for British soldiers either in the war area or at the British barracks, where hundreds of thousands of recruits have taken the place of those on foreign service.

Slag Disposal

New Railroad Tariff of 20 Cents a Ton on This Material

Railway carriers serving the Pittsburgh, Wheeling, Youngstown and Cleveland districts on Aug. 15 filed tariffs proposing a charge of 20 cents per net ton for wasting or disposing of furnace slag, flue dust, refuse, etc., and 35 cents a net ton for ashes mixed with refuse, brickbats, dirt, etc. Unless overruled, tariffs will become effective Sept. 15.

Tariffs state that the minimum weight per car will be 80 per cent of the marked capacity, actual weight to be charged for in excess of the minimum; that $25 per car will be charged shippers if material cannot be unloaded by hand, and that no allowances will be made for spotting or switching cars.

Furnace slag has been hauled gratis. It is used largely for filling purposes, and has been used to a great extent for filling railroad yards, extending switches and filling track beds. Furnace owners will oppose the effort to establish these charges. Tariffs were distributed by C. E. E. Childers, chairman of the Pittsburgh Freight Committee.

College instructors serving apprenticeships at the plant of the Westinghouse Electric & Mfg. Co., at East Pittsburgh, were entertained last week by members of the Westinghouse Club, in Wilkinsburg. Charles F. Scott, consulting engineer for the company, and professor of electrical engineering in the Sheffield Scientific School of Yale University, spoke.

Operating Exhibit

To be Made by Bureau of Mines at San Francisco

Washington, Aug. 25.—A comprehensive exhibit at the Panama-Pacific exposition is being arranged by the Bureau of Mines to show not only the value of interesting those engaged in the various mining and metallurgical industries, but also the education of the general public to a better knowledge of the magnitude of these industries. Emphasis will be laid on the efforts which are honestly being made by the miners and mine operators, with the assistance of the Bureau of Mines, looking toward a more safe conduct of mining and a more efficient utilization of the products of the mines after they are won from the earth.

The bureau's exhibit is located in the Palace of Mines and Metallurgy. An automatic duplexing machine will continuously show lantern slides illustrative of the activities of the bureau and simultaneously give descriptions of the lantern slides.

Nearby will be shown the layout of a model hospital, including a receiving room, ward room and operating room, fully equipped for demonstrations by the United States Marine Hospital Service; also a model of a change and wash house, another welfare feature which is being installed at modern mining and metallurgical operations. A plan of an ideal mining town will be shown.

First Aid Demonstration

First-aid demonstrations will be given frequently. An air of reality will be lent to the demonstration by the removal of apparently injured men from the exhibition mine beneath the building by helmet and rescue crews.

A complete display of rescue apparatus and safety lamps will be given in a glass smoke-room. Tests of safety lamps will be made, showing their tendency, under favorable conditions, to ignite explosive gas, and also showing methods of testing for explosive gas by means of their caps. An exhibit of the physical and chemical characteristics and constituents of explosives is being arranged.

Visitors going through the exhibition mine will regain the surface through the radium in which actual radium emanations will be shown. Surrounding this radium booth, there will be complete exhibits of the various radium ores of radium products. The metallurgy of various products will be shown by a comprehensive exhibit.

The opportunity for increased efficiency in the use of fuels will be demonstrated by a device showing the proportionate amounts of fuels which go to make up the various losses incident to consumption in comparison with that which ultimately goes to useful purposes. Typical analyses of coal from the various fields will be shown by models and samples, as will also the yield of coke and by-products obtained by various coking processes. It is expected to show smoke-preventing and smoke-producing methods of stoking by means of an ingenious motion-picture device.

Meet in New York

Boiler Manufacturers Hold Convention Sept. 1-4

The American Boiler Manufacturers' Association will hold its business meeting at the Waldorf-Astoria Hotel, New York, Sept. 1, 2, 3 and 4. In the morning of the opening day, Marcus M. Marks, president of the borough of Manhattan, will welcome the manufacturers and a reply will be made by Col. E. D. Meier, president of the association.

On Wednesday, Sept. 2, the committees on uniform specifications and uniform boiler laws, of which Col. E. D. Meier and L. E. Connelly are chairmen, respectively, will make their reports. On Thursday the committee on uniform system of cost-keeping, of which W. C. Connelly is chairman, and the committee on topical questions, J. Don Smith, chairman, will make their reports. Thursday afternoon and Friday will be devoted to business sessions.

Officers of the association are: President, E. D. Meier, New York; secretary, J. D. Farasey, Cleveland; treasurer, Jos. F. Wangler, St. Louis; first vice president, T. M. Rees, Pittsburgh; second vice president, J. Don Smith, Charleston, S. C.; third vice president, H. D. MacKinnon, Bay City, Mich; fourth vice president, L. E. Connelly, Cleveland; fifth vice president, Robert Joy, Oswego, N. Y.

Would Extend Organizations

Chicago, Aug. 24.—An effort is on foot to organize scrap dealers of Detroit, Toledo, Cleveland, Youngstown and Pittsburgh into a branch of the Western Scrap Iron and Steel Association. Action to this end was taken at a meeting of the Chicago branch, last week, when the president and secretary were instructed to arouse interest among dealers in these cities and to visit Cleveland, probably in October, to assist in forming the organization.

Problems of Capital and Labor

Prosecution of Alleged Blackmailers is Delayed in Chicago—Contractors Answer Assertions of Secretary of Chicago Federation of Labor

Chicago, Aug. 24. — Prosecution of alleged blackmailing business agents before the federal court seems to have been blocked by some influence not yet apparent.

United States District Attorney James H. Wilkerson and Albert L. Hopkins, his assistant, have been investigating reports of blackmailing operations which have interfered with interstate commerce and it had been supposed this evidence was being placed before the federal grand jury now in session in this city.

However, it appears the grand jury has not yet considered these cases and that Mr. Wilkerson is awaiting definite orders from Attorney General McReynolds at Washington.

It is understood the first report made to Mr. McReynolds told of the nature of the alleged blackmailing acts, their extent and effect and it is also claimed that Mr. Wilkerson explained that prosecution would not be a movement against labor in any sense, but a move in co-operation with labor to prevent use of the name of unionism as a club to obstruct interstate commerce.

The second report gave in full detail the stories related by victims whose demurrage bills and extra payments would be available as avidence of obstruction of interstate commerce.

Since these investigations have been started, no instructions have been sent from Washington to the district attorney's office in Chicago. Inasmuch as the attorney general has the authority to decide whether district attorneys shall proceed in important matters, Mr. Wilkerson apparently has not felt like beginning an investigation on his own initiative.

A feature of the case is that Mr. Wilkerson recently resigned and is to be succeeded by Chas. F. Clyne, of Aurora, Ill., and Attorney General McReynolds has been nominated as associate justice of the supreme court. These shifts also have a tendency to obstruct action in pending cases and apparently the beginning of the prosecution is to be passed on to their successors.

It is claimed that Edward N. Nockels, secretary of the Chicago Federation of Labor, has called on officials of the department of justice at Washington to consult with them in regard to the cases brought to the notice of Mr. Wilkerson. It is said that Mr. Nockels represented to the department of justice that obstruction to interstate commerce was only incidental and that it was not used deliberately as a means to the extortion. He argued that prosecution should be carried by the state in state courts and that the offense should be extortion, not obstruction of commerce.

Statements of Contractors

Chicago contractors, asked to make answer to this suggestion, have made the following declarations:

That the criminal practices, while centered in Chicago, were not local in effect.

That by the extortion and blackmail, interstate trade was shut off almost entirely in certain lines.

That many victims of the labor grafters were persons living in another state, whose only court of reprisal is the federal court.

That nearly all the cases which have been reported to the federal prosecutor are instances where the lawless action of the so-called business agents was directed against imported material, and the blackmail was demanded on the specific basis of its being made outside of Chicago, where labor conditions were different, and not because of any local situation.

That the lawless acts complained of did aim deliberately at interstate commerce, and the interstate shipments were used directly as a means of levying tribute on the basis that demurrage charges, damage to material left on freight cars in the open air, and loss of contracts through failure to be able to deliver goods would cause and be the direct means of forcing the hapless shipper to "kick in with the dough."

That blackmail was directed specifically against interstate shippers, not local contractors.

That as a result of the extortionate procedure a gigantic boycott in effect was set up, and this in many instances was precisely the object of blackmailing practice.

Agents May Organize

It has developed that a number of business agents whose names have been mentioned in the alleged blackmail operations are seeking to form an organization for the purpose of opposing the Building Trades Council, which has taken action in several instances to expel unions which refused to remove business agents at whose doors illegal acts have been laid. Officials of the Building Trades Council admit they have heard of the proposed organization but laughed at the possibility of its coming to a dimension that would trouble the council.

"It would be a good thing for the clean labor movement," said Simon O'Donnell, president of the Building Trades Council. "The course of our council has been one that was and could be pursued in the open light of day.

"The Building Trades Council's policy, 'no strikes—arbitrate, but work while you arbitrate,' has been justified by its success. Whether the union was right or wrong in each specific instance, the workmen haven't had to go without employment and pay while the question was being fought out and the employer or builder has not had to let work stand idle.

"If that policy had been followed and unwarranted strikes and crookedness had been left out of operations of the men we have excluded, they would have been with us today."

Among those reported interested in the new project are the following, although none will admit he is taking part in the movement:

Michael J. Boyle, whose alleged extortionate practices enabled him to "save" $350,000 in eight years on a salary of $50 a week, gaining him the title of "frugality expert," but costing him his job as business agent of the International Brotherhood of Electrical Workers, Local 134.

Charles Cameron, former business agent, who was thrown out of the Painters' District Council as a grafter after he had been shot by two members upon whom it is alleged he was preparing at the moment to fire.

Thomas Walsh, business agent of the Amalgamated Sheet Metal Workers' Local No. 73, who was thrown out of the Building Trades Council for calling unwarranted strikes and who took with him the union that sanctioned his acts.

Herman B. Seltman, business agent of the Upholsterers' District Council and several component parts of it, thrown out of the Building Trades Council for extortion and blackmail with local 111 of the upholsterers, which sanctioned his acts.

Frank Maeder, assistant business agent of the upholsterers, who may not hereafter occupy a seat on the trades council's board of business agents because of his acts.

Michael Artery, business agent of the Machinery Riggers' and Movers' Union and named by a dozen refrig-

Problems of Capital and Labor

Contractor Seeks Unusual Injunction—Interesting Comparison of Labor Laws of the United States and Europe

eration machinery buyers as the agent who extorted thousands of dollars from them with fake strikes.

John Dohney, business agent of the Boilermakers' and Iron Shipbuilders' Local No. 1, who is accused by many contractors and manufacturers of blackmailing them in co-operation with Artery and sometimes on his own initiative.

H. Hahn and W. E. Staley, business agents of the Glaziers' Local No. 27, who are dissatisfied with the action of the Painters' District Council, which refused to allow to be published any more of the labor trouble list which had been used by the extortionists and blackmailers as a medium of communication for which they personally would not be responsible.

Asks for Injunction

Chicago, Aug. 24.—Several peculiar situations have developed in this city recently over labor disputes.

Samuel Goldberg, 2706 Haddon avenue, a plastering contractor, has asked the superior court for an injunction to restrain the Plastering Contractors' Association and Plasterers' Union No. 2 from interfering with his employes. He charges a combination to fix prices illegally and to control contracts for plastering in Chicago.

Several months ago, a fine of $300 was imposed on him on the charge he paid less than the union scale. This was denied and the fine was not paid, a strike following. On his promise to pay the fine, the strike was called off and Goldberg's men returned to work.

The fine has not been paid and Goldberg claims the business agent of the plasterers' union threatens another strike unless settlement is made.

In the bill asking an injunction Goldberg says:

"The association, by means of petty charges preferred against a contractor, and without giving him a fair trial, levies a fine upon the contractor, and upon the levying of the fine the officers of the plasterers' union No. 2 are called upon to collect the fine; and upon the refusal or failure of such contractor to pay such a fine, then the officers of the said union thereupon call a strike and refuse thereafter to allow the members of said union to be employed by such contractor."

Friedrich Ahrensdorf, 1556 Austin avenue, has written a letter to Judge Brentano of this city, threatening to commit violence unless something is done to make it possible for him to obtain employment as a carpenter. He alleges a fine of $25 was imposed upon him by the carpenters' union for calling a strike when his wages were reduced from 65 cents to 50 cents per hour. Since refusing to pay this fine, Ahrensdorf claims he has been unable to obtain work and faces starvation.

Labor Laws of Europe

Washington, Aug. 24.—Emphasis is laid on the need of training and character in the inspectorial force in administering and enforcing labor laws, in Bulletin No. 142 which has just been issued by the United States Bureau of Labor Statistics of the Department of Labor. The bulletin is a review of the experience of foreign countries in the administration of labor laws and factory inspection, these countries including Great Britain, Germany, France, Austria, Switzerland and Belgium.

In only one of these phases of administrative work was marked superiority found in the countries visited as compared with the United States, a report on the subject says. This was in the training and character of inspectors. In Europe, it is pointed out, the position of factory inspector can be secured only after long technical training and severe tests.

Labor laws in the foreign countries named, it is stated, date back to the beginning of the nineteenth century, but the first measures for their enforcement were not passed until 1833 when factory inspection was established in England, while similar action was not taken elsewhere until 1874, when France created a labor inspection department, followed by Switzerland in 1877, Germany in 1878, Austria in 1883 and Belgium in 1888.

In France and Belgium the whole work of labor-law enforcement is centered in the labor inspection departments, but in England the local authorities have jurisdiction over the enforcement of all sanitary provisions in workshops. In Germany the factory laws are administered by the industrial inspectors, inspectors of insurance associations, and police authorities, and in Austria by the industrial inspectors and the local industrial authorities. In Switzerland, there is division of jurisdiction between the federal factory inspectors and the cantonal inspectors, while the enforcement of the laws is entirely in the hands of the local police and the cantonal authorities. England and Belgium are declared to be the only countries having separate medical divisions, and even there the number of physicians is small. Women inspectors number 20 in England, where they occupy the unique position of being practically independent in their work and functions. Outside of England, the work of women inspectors is limited to small shops where women and children are employed.

"There is great demand among the laboring classes for workingmen inspectors," says the report. "This has met with considerable opposition from some of the governments, as well as from regular inspectors. England has 55 workingmen inspectors, but their functions are limited, their salaries low, and their status entirely different from that of regular inspectors. Prussia, France and Switzerland have no such inspectors as yet and there are only a few in Austria, Belgium and some of the German states."

England is credited with furnishing an example of a highly centralized organization, with a chief inspector, division inspectors, district inspectors and the lower grades of inspectors. In England also is found much specialization of functions among medical inspectors, dangerous-trades inspectors, electrical inspectors, etc. Prussia and Switzerland are referred to as examples of the decentralized type in the inspection departments, having no chief inspectors, but only district inspectors with the whole field of industrial inspection under their jurisdiction. The supervision of Austria's central industrial inspector does not extend as far as that of the chief inspector in England. In France, the division inspectors are charged with much of the inspectorial work.

Little progress in scientific standardization of safety and sanitation is declared to have been made in Europe and labor laws in many instances fail to give exact standards for the guidance of inspectors and for the use of manufacturers and employes. Inspection to detect violations of law is still the method used by most inspectors and most European inspec-

Problems of Capital and Labor

Strike of Machinists at Trenton—Digest of Recent Decisions in Labor Cases—Call Off Chicago Strike

tion departments are said to be far behind the more progressive departments in the United States in regard to keeping records of inspections, violations and similar matters.

Strike at Trenton

Trenton, N. J., Aug. 24.—Every machine and iron plant in this city is affected to a large extent by the general strike of the machinists, which has been in progress for many weeks. Although some of the plants have succeeded in securing non-union help from the Philadelphia employment agencies, others have not secured enough or in some cases poor mechanics.

The strike was begun some time ago because of the refusal of the employers to pay a flat scale to all members of the union. The Master Machinists' Employers contend that some men are worth more than others and therefore will not pay the scale demanded.

The strike is giving the police plenty of trouble because of the action of the strikers in attacking non-union men at the various plants. The machinists have threatened to call out all the foundrymen in an attempt to tie up all the plants. Hugh V. Reilly, of Newark, N. J., national organizer of machinists, is here looking after the strikers. The Trenton Chamber of Commerce and the City Commissioners both tried to have the strike brought to an amicable settlement, but the boss machinists refused to have the matter arbitrated.

Digest of Labor Decisions

Washington, Aug. 24.—The Federal Bureau of Labor statistics has just issued bulletin No. 152 containing a summary of about 170 judicial decisions and opinions as to the construction and application of laws of the various states on the subject of labor. Opinions of the attorney general of the United States on certain federal labor laws are also summarized. In addition to the 170 decisions relating to statute law, there are some based on the common law.

Most notable are the decisions dealing with the new remedy of workmen's compensation for industrial accidents. The constitutionality of the laws of New Jersey and Washington on this subject was questioned in cases coming before the supreme courts of these states, the laws being upheld in both instances. Discussions that are especially important because of the new field into which they enter are had of various phrases and general provisions of the laws, as those relating to the dependence of the claimant on the injured workman, injuries arising out of and in course of employment, the measure of awards, etc. A case of special importance in this group is one which considers that provision of the law of Wisconsin which makes it the duty of the employer to provide medical treatment for the injured workman—a much discussed feature of such laws, and of prime importance and held to be capable of grave abuse. The court pointed out ways in which the possible abuses may be avoided.

Decisions construing the federal statute relating to the liability of interstate railroads for injuries to employes, the chief point being the scope of this law, are dealt with.

Of the cases in which organized labor has shown a deep interest, the most noted is the affirmation of the judgment of contempt against the leaders of the American Federation of Labor by the court of appeals of the District of Columbia, growing out of the injunction against these officials on account of the boycott of the Buck's Stove & Range Co., St. Louis. The supreme court of the United States in May, 1914, reversed this judgment because of the lapse of time since the acts complained of were committed, without, however, expressing any opinion as to the merits of the case. Of almost equal importance is the case of the Hitchman Coal Co., West Virginia, against John Mitchell, in which Judge Dayton declared that Mitchell and his associates had attempted to establish a monopoly of labor in the coal fields of the state, and made perpetual an injunction against them. Other cases discuss the force of agreements with labor unions as to conditions of employment, the duty of union officials to control the acts of members, the liability of a treasurer for the embezzlement of union funds, etc.

The constitutionality of a number of laws was challenged, laws of Georgia and Mississippi attempting to provide a form of enforcement of the contract of employment under certain conditions being declared void, as was a law of Illinois forbidding the use of emery wheels, etc., for polishing processes in basements, without reference to the actual conditions as to ventilation, and one of Louisiana limiting the hours of labor of certain classes of stationary engineers. All these laws were held to attempt unjustifiable discriminations. The state of Mississippi stands alone with a law regulating the hours of labor of factory workers without regard to sex. This law, which was last year declared constitutional, was again upheld, as was the 10-hour law of Illinois for women.

The only subject considered in the attorney general's opinions noted is that of the recent eight-hour legislation by Congress. This is regarded as not applying to the manufacture of supplies purchasable in open market, even though such supplies must conform to the particular specifications, nor to the construction of post roads under the supervision of the Secretary of Agriculture, provided for by the postoffice appropriations act of 1912.

Strike Called Off

Chicago, Aug. 24.—After a struggle of a year, Sheet Metal Workers' Union No. 73 has called off strikes in this city and has agreed to arbitrate the differences it has with employers' associations. The Building Construction Employers' Association took action last week to order a lockout against this union and members of the Sheet Metal Manufacturers' Association ordered the lockout unless the strikes were ended.

The controversy began a year ago on refusal of the Sheet Metal Workers' Union to recognize the conference committee of contractors and Building Trades Council officers, which provided for settlement of disputes by arbitration, work to be continued pending a decision.

The Building Trades Council expelled the union after a number of strikes were called and the action of the Building Construction Employers' Association put a further ban on the organization.

Now that the strikes have been called off and an agreement made to arbitrate, it is believed the trouble will be settled without difficulty. Among the buildings where strikes were in progress are the new county hospital, the McKinley theater and the Waller building. It is claimed these strikes were in violation of the Building Trades Council's rules.

Merchant Marine Strongly Urged

By Detroit Motor Car Manufacturers—Banking Facilities Also Needed to Promote Foreign Trade

Detroit, Aug. 24. — Detroit motor car manufacturers are very optimistic in the face of a distressing situation in Europe and a majority of them seem confident that the war will not have a serious effect on the industry in the United States. It is pointed out that the business which went to Europe (and, of course, this was considerable) can be diverted into the channels of South American trade and that new territory will be exploited successfully. The Detroit Board of Commerce, an organization that is largely controlled by the automobile industry of the city has already secured the services of William A. Reed, federal expert on South American trade, to assist it in developing the patronage of the Latin countries. "The different industries will have to sell their own goods of course," declared President Charles B. Warren, of the organization, "but we can form a clearing house of information and advice and the motor car industry will be given every assistance. We can secure all the available government data and also have men in the bureau who can give all needed information."

Here are three things Detroit motor car producers are especially urging:

Banking connections.
A merchant marine.
Sales agencies in the countries with which the United States wishes to deal.

It is generally agreed that these steps must be taken in the order named.

General Manager MacCauley, of the Packard Motor Co., is one prominent producer who can see nothing but a silver lining to the dark war clouds and despite the fact that a large number of Packard cars have been impressed into the service in France and other belligerent countries, Mr. MacCauley insists that conditions in the automobile trade are bound to be pleasing.

The manufacturers of cars selling at a ready price, such as the Ford, Krit, Overland, Paige and others, also express confidence in general conditions as well as a confidence in the fall and winter demand.

May Have Been Captured

Steps have been taken at Washington to protect a consignment of drilling machinery shipped by the Keystone Driller Co., Beaver Falls, Pa., on a German merchant ship to a firm at Hamburg, Germany. The ship, the Kronprinzessen Cecilie, of the Hamburg-American line, is reported to have been taken as a prize of war by the British. The ship is not the vessel of the same name that turned back to Bar Harbor, after an exciting voyage half way across the Atlantic.

Cincinnati Sees Obstacles

Cincinnati, Aug. 24.—Machine tool manufacturers in Cincinati are firm in their statement made a short time ago that they did not expect any noticeable amount of new business from South American fields because of the European war. They insist that the South American territory has been carefully analyzed more than once, and it has been found to be unsatisfactory in more ways than one. One chief objection to selling to South American shops is that in a number of cases they demand credit ranging from two to five years. Cincinnati machine tool makers claim that they are not willing to allow this, and have, therefore, never solicited South American trade to any extent. They admit, however, that large numbers of machine tool users in other countries, who have formerly been buying from German, French and English manufacturers, will be forced to come to the United States for requirements as long as the present war is in progress, but stocks already on hand are sufficient to care for orders of this kind for a year at least. One machine tool shop in this city has slightly over $400,000 invested in machines stored in its factory which it has been unable to sell, and there is not a machine tool company in Cincinnati which has not a comparatively large surplus of stock that it has been unable to sell. On the whole, therefore, Cincinnati machine tool makers are not very optimistic over the prospects of South American fields bringing about a revival of business in this country.

They say that the domestic demand, which must necessarily be slightly increased because of the inability of foreign makers to import into this country, will be offset by the withholding of exports from the United States to Europe. A large amount of business among Cincinnati manufacturers is to export trade, and this will, in a certain sense, counterbalance any increase in domestic business that may result because of the war. Manufacturers here state that in their opinion stocks on hand will be ample to cover both domestic and South American inquiry for more than a year.

Will Investigate in South America

Wishing to enlarge the market for the products of their clients, W. L. Rickard, of Rickard & Sloan, Inc., New York, will make an extended trip through South America, leaving New York the latter part of September. He will visit the principal cities on both coasts and will make a thorough investigation of the markets and the best method of selling machinery and mechanical materials and devices. In connection with this trip Mr. Rickard made the following statement: "For some time past, several of our clients have been considering the advisability of entering the export field, particularly in South America. They have felt that the Latin-American countries offered a large market for their products and we have been conducting a preliminary investigation in this field to ascertain the best way to reach it. Naturally with the countries which have had the lion's share of this business at war, and their industries practically at a standstill, the question has been brought to our attention more forcibly than ever. In order that we may determine just what a manufacturer has got to do to obtain some of this business, we decided that a personal investigation was the only thing and for that purpose I will visit the largest cities and make a thorough investigation for those of our clients who can profitably enter this field. I expect to be away between four and five months. While I dislike to take this time from my regular work, I am confident that the necessary information to enable us to make intelligent recommendations to our clients can be obtained in no other way."

Brussels Plant Burned.—Word that the plant of the Pittsburgh Plate Glass Co., at Courcelles, near Brussels, Belgium, has been burned was received last week by officers of the company at Pittsburgh.

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

At New York, the machinery market the past week has further reflected the upset financial conditions and the uncertainties into which the metal-working industries here have been plunged, perhaps temporarily, in common with all other lines of trade. There is much talk of the eventual benefits that may come to American machinery builders through the opening of new export opportunities and through the stimulating of such classes of production as have rested hitherto with German and other European manufacturers. But none of this speculation has extended beyond the appearance of some inquiries to domestic manufacturers from houses handling foreign machinery now shut off, which are endeavoring to lay new lines to accommodate their trade. It is too early yet in the period of adjustment necessitated by the extraordinary set of conditions to expect any appreciable development in the direction of foreign trade, especially since methods of transportation, communication and credit still are so unsettled. The initial paralyzing effect of the crisis on machinery builders and users still leaves its impress upon the market and business of the past week has been decidedly spotty and, on the whole, light. The railroads, owing to financial stringency, are postponing for 30 days action on any lots of machinery for which they may have been inquiring. This is the status of the recent Seaboard Air Line list of tools, but as yet it apparently has not applied to the Chesapeake & Ohio list, as the dealers still are figuring upon this requirement. Export orders on the books of American machinery builders are suspended indefinitely either by direct advice from buyers or through the voluntary action of the manufacturers who have been unable to get any communication from their customers on this matter. The Pratt & Whitney Co., Hartford, Conn., has received suspension of orders from Russia and other New England manufacturers have been similarly affected, so that their export trade to Europe, at least, is at a standstill.

At Pittsburgh, prospects of selling machine tools have become more unfavorable recently because of the adoption of more conservative policies on the part of buyers, practically all of whom have retrenched until the return of more normal conditions. Despite reliable reports that the financial situation in the United States is sound, it is apparent the rather unusual methods employed to maintain the equilibrium of the money market have caused further hesitancy, and machine tool builders and sellers appear to be among the first to be affected by the wave of conservatism. Although foreign business enjoyed by manufacturers of tools in this district is small, suspension of shipments to European and South American countries has affected the local market to some extent. Builders of heavy rolling mill equipment continue to operate plants at practically full capacity, but new orders are light.

In Cincinnati, machine tool business dropped off considerably during August in comparison with that of July. The main cause is the cancellation of numerous export orders because of the present European war and the almost minimum demand from users in this country. Machine tool makers in this city have large stocks on hand, and none are running at full capacity. Several have closed down indefinitely because of lack of orders. Second-hand machinery is slow and unsatisfactory. Ball bearing makers here are busy on both old and new orders, and makers of special machinery, such as laundry and baking equipment, are busy on old orders, but new contracts have been falling off. The demand for small electrical equipment is fair, but does not show any tendency to improve.

EASTERN STATES

OLD TOWN, ME.—Penobscot Chemical Fibre Co. plans to lay additional trackage about its mill and to install an overhead system of carriers for its enlarged plant, the new mill of which is now being erected.

VINALHAVEN, ME.—Vinalhaven Electric Power Co. has been incorporated; $50,000; by Thomas L. Libby, Frederick S. Walls, Henry J. Sage, and Charles H. Bradley Jr., both of Boston, Mass.

CAMBRIDGE, MASS.—Simmons Mfg. Co., steel and iron, has been incorporated; $10,000; by C. D. Barnes, Andrew H. Lance, Kenosha, Wis.; C. J. Moore.

WEBSTER, MASS.—S. Slater & Sons Co. has awarded the contract for a 4-story, 78 x 92-foot warehouse.

BRIDGEPORT, CONN. — Max Ams Machine Co. has placed the contract for the extension of its plant with the Eastern Steel & Structural Co.

NEW BRITAIN, CONN.—Reliable Laundry Co. has been incorporated; $25,000; by Fred Beloin, P. J. Gagner, Joseph F. Theberge.

PLAINSVILLE, CONN.—Trumbull Electric Co. has awarded the contract for a 1-story 25 x 55-foot brick addition to its plant.

BATH, N. Y.—Board of trustees, New York state Soldiers and Sailors' Home, will receive bids Sept. 8 for two 125-horsepower boilers; Lewis F. Pilcher, state architect, Albany, N. Y.

BUFFALO.—Oliver Goldsmith filed plans for a $50,000, 3-story, reinforced concrete factory at 172 Urban street.

BUFFALO.—Sterling Engine Co. will erect $3,400, one-story, metal and frame addition to factory No. 1250.

BUFFALO, N. Y.—W. & L. Mfg. Co., autos, repairing machinery, etc., has been incorporated; $30,000; by Harry Z. White, Benjamin C. Lee, Purl U. Lee.

GENEVA, N. Y.—Seneca Motor Car Co. has been incorporated; $25,000; by C. E. Hamilton, G. M. Chase, A. G. Lewis.

JAMESTOWN, N. Y. — Gabrielson Car Parts Mfg. Co. has been incorporated; $35,000; by O. A. Lenna, G. A. Lawson, John Gabrielson.

NEW YORK.—C. Leicester Payne estate will build a $30,000, 3-story, 68.5 x 121.7-foot warehouse; Hopkins & McEntree, architects.

NEW YORK.—Homer & Cortland Gas Light Co. has increased its capital from $100,000 to $200,000.

NEW YORK.—Good-Wen Welding Co. has been incorporated; $10,000; by Joseph T. Goodwin, Mabel T. Goodwin, John Edmond Hewitt, 462 West 151st street.

NEW YORK.—Vittoria Piano Co., manufacturer, has been incorporated; $10,000; by Stephen Acunto, Antonio Scaturo, Placido Comunale, 11 East Fourteenth street.

NEW YORK.—Alexander-Holden Paper Co., maker of paper, has been incorporated; $50,000; by Jas. B. Alexander, Edward P. Holden Jr., Edward P. Holden, 32 Nassue street.

NEW YORK.—Bleustine & Green Co., maker of perambulators, trunks, etc., has been incorporated; $15,000; by Max Green, Max

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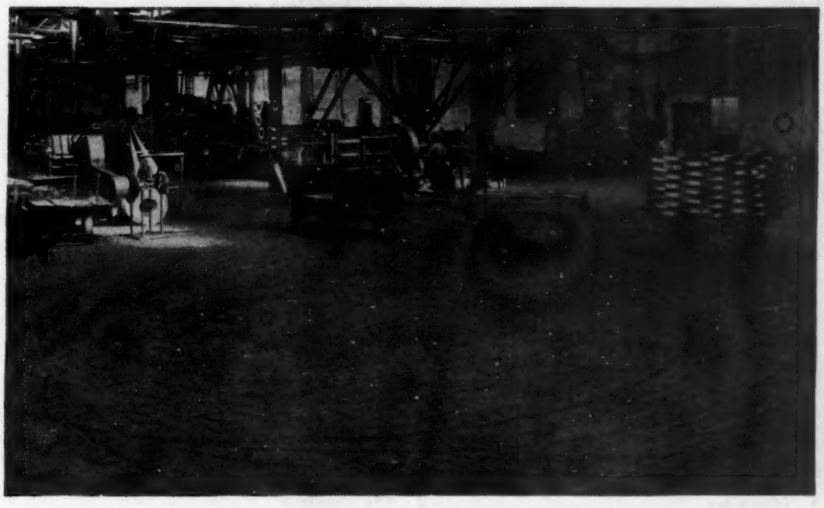

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Feldman, David Feldman, 1813 Third street, New York.

NEW YORK. — Iron Process Corporation, maker of filtering plants, etc., has received its charter; $500,000; Mauri, Maffucci, Julius Seward, James Pelende, Newark, N. J.; incorporators.

NEW YORK. — Riebe Ball Bearing Co., maker of ball bearings, auto devices, etc., has been incorporated; $20,000; by Emil W. and Leo L. Lowry, Joseph Hover, Hackensack, N. J.

NEW YORK.—Passach-Voice Lithographing Co., die casting, printing, etc., has been incorporated; $150,000; by H. L. Geller, Nathaniel M. Kaplan, Oscar Passach, Hoboken, N. J.

NEW YORK.—Greystone Silica Products Co. has been incorporated; $200,000; by Henry M. Kahn, 226 Manhattan avenue, Charles H. Ryack, Samuel N. Ryack, both of Greystone, Conn.

NEW YORK.—I. Michelman & Bros., makers of clothing, textiles, etc., have been incorporated; $80,000; by Max H., Meyer A., and Barney N. Michelman, all of 458 Broadway.

NEW YORK. — Eureka Projector Device Co., maker of motion picture projectors, etc., has been incorporated; $100,000; by Jas. F. McGrath, R. A. Kraus, J. Chester Hasbrouck, 11 West Thirty-ninth street.

NEW YORK.—Samuel Molostowsky Corporation, maker of wooden and metal furniture, has received its charter; $10,000; Abraham Molly, Leo Rosenberg, Benjamin Davis, 299 Broadway.

ONEIDA, N. Y.—Mohawk Valley Mfg. Co., carriage hardware, will erect a 1-story, 45 x 90-foot, concrete factory building.

ROCHESTER, N. Y.—Highlander Machine Co. has been incorporated; $20,000; by Roy O. Benedict, H. R. Hopcraft, Orburn Gurney.

ROCHESTER N. Y.—J. Lawrence Hill Co., auto storage batteries, has been incorporated; $10,000; by J. Hill, J. Jaffray, J. Lawrence Hill.

ROME, N. Y.—Rome Metal Co.'s engine room was wrecked by fire; loss, $75,000 covered by insurance.

SYRACUSE, N. Y.—International Foundry Co., brake shoes and car appliances, has been incorporated; $300,000; by F. E. Ehrgood, W. A. Steckel, W. S. Cummings.

SYRACUSE, N. Y.—F. J. Poehlman Mfg. Co. has been incorporated; $50,000; by Frederick J. Poehlman, George F. Sax, Patrick F. Ryan.

TROY, N. Y.—Troy & West Troy Bridge Co. is having plans prepared for a bridge across the Hudson river; bids will be asked about Sept. 1.

VICTOR, N. Y.—Locke Insulator Co. Mfg. has increased its capital from $600,000 to $800,000.

ALLENTOWN, PA.—Work has been started on the Fechheimer Steel & Iron Co.'s new warehouse.

CATASAUQUA, PA. — Leicester Rubber Co.'s plant, destroyed by fire, will be rebuilt immediately.

CORRY, PA.—U. S. Brakeshoe Co. has started to erect a 40 x 60-foot addition to its plant, to be used as a machine shop.

ERIE, PA.—Erie Art Metal Co. has increased its capital from $20,000 to $60,000.

ERIE, PA.—Ball Engine Works is having a 1-story building erected, to be used to assemble steam shovels; estimated cost, $50,000.

FARRELL, PA.—Borough council is considering a $5,000 garbage incinerator, consisting of 2-unit furnaces.

GROVE CITY.—Bessemer Motor Truck Co. has increased its capital from $100,000 to $300,000.

HARRISBURG, PA.—Application for a charter of incorporation for the Electrical Engineering & Mfg. Co. has been made by Robert S. Chess, William F. Knoell, A. W. Forsyth.

HARRISBURG, PA.—Monongahela Southern Traction Co. has been incorporated to construct and operate a line from California, Pa., to Brownsville, Pa.; $108,000; by J. P. McKelvey, Pittsburgh; L. V. Phillips, Uniontown, Pa.; C. Snowden, C. H. Strong, F. B. Snowden, all of Brownsville.

PHILADELPHIA. — Hess-Bright Mfg. Co. will erect a large plant to make its supplies for its roller bearing manufacture.

PITTSBURGH.—National Metal Molding Co. has increased its debt limit to $500,000.

PITTSBURGH—Barney, Walter A., Herbert L. and Edwin C. May will erect a $30,000, 5-story, 24 x 100-foot, brick and terra cotta warehouse.

READING, PA.—Capitalists of this city are interested in a movement to build a trolley line between here and Tuckerton.

CLIFTON, N. J. — Lubricating Accessories Co., manufacturer, has been incorporated; $25,000; by John Swenson, Robert M. Haubner, Paul A. Ott, Oscar A. Carlson.

HARRISON, N. J.—Driver Harris Wire Co. has purchased the Globe Wire Co.'s 100 x 107-foot factory.

NEWARK, N. J.—Cyrus Currier & Son will erect a $12,000, 1 and 2-story, 50 x 110-foot brick addition to its machine shop; Arthur Miller, architect.

NEWARK, N. J.—Central Foundry Co. has been incorporated; $10,000; by Waddill Catchings, R. B. Chispell, Decourcey Cleveland, H. H. Sykes, New York.

PATERSON, N. J.—John W. Ferguson Co. has the contract for the Great Falls steam power plant; it will be 1-story, 110 x 125 feet; cost, $45,890.

TRENTON, N. J.—St. Regis Corporation, Philadelphia, will erect a $110,000 theater here; work to start shortly.

TRENTON, N. J.—Burton & Burton will erect the Princeton Worsted Mills Co.'s $6,000 addition to its plant.

TRENTON, N. J.—Thermoid Rubber Co. will erect a large addition to its plant; it recently purchased a 75 x 1,000-foot plot.

BALTIMORE.—Horace D. Ford has the contract for Henry D. Koethe's ½-story addition to his 3½-story, 35.11½ x 68½-foot warehouse; cost, about $10,000.

WASHINGTON, D. C.—Ordnance work, of the Firth-Sterling Steel Co., at Giesboro Manor, will add a $7,500 1-story, 40 x 80-foot, steel drop forge plant, that will have a corrugated iron roof.

The Machinery News in Miniature

BELOW will be found the most important new business items of the week boiled down for the busy reader. They are culled from a great mass of less important information for your benefit. Even if your time is limited, look over this list every week.

Barnett & Record Co., Minneapolis, has the general contract for an elevator for the Pillsbury Flour Mills Co., to consist of 80 tanks, 100 feet high and 26 feet in diameter.

Northern Pacific Railway Co. is planning to build a $500,000 roundhouse and repair plant at St. Paul

Cleveland Electric Railway Co., Cleveland, is erecting seven buildings, including a 120 x 184-foot storage warehouse, 30 x 101-foot oil storage building, 55 x 87-foot office building, 157 x 184-foot truck repair building, 119 x 151-foot boiler house, 184 x 209-foot repair shop, 37 x 86-foot garage. Buildings will be of brick, steel and concrete and will cost about $250,000.

International Foundry Co., Syracuse, N. Y., has been incorporated to manufacture brake shoes and car appliances; $300,000; by F. E. Ehrgood, W. A. Steckel, W. S. Cummings.

Penobscot Chemical Fibre Co., Old Town, Me., plans to install an overhead system of carriers for its enlarged plant, the new mill of which is now being erected.

Shredded Wheat Biscuit Co., Niagara Falls, N. Y., will erect a $150,000 plant at Oakland, Cal. Four-fifths of the exterior will be of glass.

Pinney & Boyle Mfg. Co. will erect a plant at Los Angeles to consist of nine buildings; the largest to be 300 feet square and the smallest 30 x 50 feet.

Chamber of Commerce, Chattanooga, Tenn., has donated a site in Allen Park for the $1,000,000 by-product coke ovens to be constructed by the Durham Coal & Iron Co.

Paul Mfg. Co., Fort Wayne, Ind., manufacturer of pulleys and kitchen cabinets, was destroyed by fire with a $60,000 loss; plant will be rebuilt immediately.

Gillis & Brittain, Ogden, Utah, have a permit to build an $85,000 can factory, which will be completed about Oct. 30. Machinery and equipment will be installed at a cost of $150,000.

CENTRAL STATES

AKRON, O.—Carmicheal Construction Co. has the contract for the Firestone Tire & Rubber Co.'s addition to its plant.

ATHENS, O.—State public utilities commission has authorized a $300,000 bond issue by the Hocking-Sunday Creek Traction Co.; $143,800 will be used to construct and equip a line between here and Chauncey, a distance of five miles.

BARNESVILLE, O.—Lotus Cut Glass Co. has awarded the contracts for its plant.

CANAL DOVER, O.—Board of trade has succeeded in negotiations whereby the Auto Products Co., Canton, O., will remove to this city as soon as $20,000 worth of 7 per cent preferred stock can be sold; it is planned to begin operations within 60 days.

CANTON, O.—C. L. Stoner, clerk of county commissioners, will open bids Sept. 9 for the substructure and superstructure of the South Erie street bridge, Massillon, O.; 182,000 pounds of re-inforcing bars, 1,020 feet of setting pipe railings and posts, 523,000 pounds of steel work; certified check, $500 required.

CINCINNATI.—Hydrogenation Co. has increased its capital from $3,000 to $3,000,000.

CINCINNATI.—Donaldson Art Metal Sign Co. is having plans prepared for a factory to be erected in Banklick road.

CLEVELAND.—Standard Knitting Co. has increased its stock from $200,000 to $300,000.

CLEVELAND.—Emil Hribal will build an $8,000 brass foundry at 6601 Morgan avenue.

CLEVELAND.—Superior Foundry Co. has a permit for a $5,000 factory addition; Forest City Engineering Co. has charge of work.

CLEVELAND.—Colonial Brass Bed Co. has been incorporated; $5,000; by T. J. Blase, Leo Oppenheim, et al.

CLEVELAND.—Hale Electric & Engineering Co. has increased its capital from $10,000 to $25,000.

CLEVELAND.—County will vote in November on $5,000,000 bonds for a third high level

bridge to be constructed to span the Cuyahoga river half way between the Central and Superior viaducts; County Engineer has plans prepared.

CLEVELAND.—H. J. Slatmyer has the contract for the Star Baking Co.'s $100,000, 120 x 800-foot plant, to be erected at Lakeview avenue and the Nickel Plate tracks.

CLEVELAND. — Architects Walker & Weeks, expect to invite bids for the $200,000, 5-story, 53 x 173-foot Charity hospital within the next few weeks.

CLEVELAND.—Harry A. Cones, architect, has the plans for the Cleveland Suit & Skirt Co.'s $12,000, 2 and 3-story, brick, steel and concrete factory building; bids are now open.

CLEVELAND.—Davis-Skeel Co. will erect a $50,000, 4-story salesroom and service station at 2020-24 Euclid avenue for the A. R. Davis Motor Car Co.

CLEVELAND.—Ohio File Renewing Co., Niles, O., will move here immediately and will occupy the plant formerly occupied by the Comey & Johnson Co. in West Seventy-seventh street.

CLEVELAND.—E. G. Krause, clerk of county commissioners, will open bids Sept. 12 for the construction of bridge work per report No. 3356; plans with county surveyor; certified check, 10 per cent, required.

CLEVELAND.—Cleveland Seating Co. will erect a plant on a 5-acre site in Collinwood; main building, 100 x 400 feet, there will also be a power plant and a battery of dry kilns; cost, about $75,000.

CLEVELAND.—Cleveland Electric Railway Co. is erecting seven buildings including a 120 x 184-foot storage warehouse, 30 x 101-foot oil storage building, 55 x 87-foot office building, 157 x 184-foot truck repair building, 119 x 151-foot boiler house, 184 x 209-motor repair shop, 37 x 86-foot garage; building to be of brick, steel and concrete; cost about $250,000.

COLUMBUS, O.—State Lumber & Mfg. Co. has ben incorporated; $30,000; by Wm. A. Slatter, J. J. Kindell, C. F. Napier, V. M. Cummins, J. N. Thomson.

COSHOCTON, O.—Beach Enameling Co. will erect a 1-story, 70 x 120-foot addition to its plant and the machine department will be increased to 50 x 50 feet; R. N. Kirk has the contract.

DAYTON, O.—F. W. Andrews Chemical Co., refrigerating machinery and regrigerating gas, has been incorporated; $100,000; by Bert Drake, Thomas C. Whetsel, Frank H. Shiddaker, B. H. Rannells, F. W. Andrews.

DAYTON, O.—Petitions are in circulation requesting the city commission to place the proposition of having a municipal light and power plant on the ballot at the November election.

DELAWARE, O.—County auditor will open bids Sept. 10 for the superstructure of the 340-foot Beiber bridge, Liberty township; consisting of two 82-foot, 4½-inch pin connected low truss spans and three girder spans, 50-foot each, and 16-foot roadway; certified check, $200, required.

DENNISON, O.—Dennison Foundry & Machine Co. has increased its capital from $15,000 to $40,000.

DENNISON, O.—A 22-inch press will be installed in the Dennison Sewer Pipe Co.'s 2-story, 64 x 80-foot, brick addition.

FREMONT, O.—P. J. Hasselbach, county auditor, will open bids Sept. 12 for the superstructure and substructure of the 335½-foot Tindall bridge in Ballville township, consisting of 3-span steel superstructure, creosoted block floor, and the construction of two abutments and two piers with concrete; certified check 20 per cent required.

HAMILTON, O.—C. V. Hargitt, is one of the incorporators of a company in Cincinnati which will shortly begin the manufacture of soap and toilet accessories; capital, $50,000.

KENT, O.—Falls Rivet Co. is in the market for an 8,000-gallon storage tank for sulphuric acid.

MANSFIELD, O.—E. G. Slough, chamber of commerce secretary, says that the Standard Chain Co.'s plant at St. Marys, O., will be moved to Mansfield.

MARTINS FERRY, O.—Brown & Boyd, contractors, has started the erection of the Wheeling Corrugating Co.'s chemical plant.

MIDDLETON, O.—United Paint Co., capital, $100,000; backed by local and Cincinnati people, will probably locate here; plans for a 4-story, brick factory building have been completed by Hamilton, (O.) architects.

MILLERSBURG, O. — Helmuth Slate & Steel Co. has increased its capital from $25,000 to $50,000.

NORWALK, O.—County commissioners will open bids Sept. 15 for the White Rox river bridge, Clarksfield township, steel superstructure; Hopkins bridge, Fairfield township, steel superstructure; certified check payable to Charles E. Bloomer, county auditor, for $200 required.

SCIOTOVILLE, O.—Chesapeake & Ohio railway bridge will be built across the Ohio river at Sciotoville.

SPRINGFIELD, O.—E. L. Shuey Co., Dayton, O., has plans prepared for its $150,000, 5-story, factory building, to be erected here; W. J. Fraser will receive bids about Sept. 15.

TIFFIN, O.—A. Bentley & Sons, Toledo, O., will erect four fireproof buildings for the Great Western Pottery Co.; it is said by the management that this is only the beginning of enlargement plans.

WARREN, O.—Work on the construction of the Nuby Insulator Co.'s plant is expected to begin next week.

XENIA, O.—Local capital are considering the Shawnee Refrigerating Co.'s property as a possible location for a new foundry.

YOUNGSTOWN, O.—County commissioners are planning to build a steel bridge to replace the old structure now spanning the river.

YOUNGSTOWN, O.—Contracts for the Concrete Steel Co.'s shop will be let next week, according to an announcement.

YOUNGSTOWN, O.—J. S. Curley, district manager, Concrete Steel Co., says that the contract for the novelty shop to be erected adjoining the Hezlop street works, will be awarded this week.

ZANESVILLE, O.—C. J. Dunlap heads a party of financiers, who are said to be interested in the proposed interurban line between Wheeling, W. Va., and Cambridge.

ZANESVILLE, O.—Fred C. Werner, clerk of county commissioners, will open bids Sept. 14 for a steel plate viaduct, reinforced with concrete, at the west end approach of the Duncan Falls bridge at Duncan Falls, O.; it will have a 16-foot roadway, 6-foot sidewalk and will be 200 feet long; certified check 10 per cent required.

CAMERON, W. VA.—J. B. Allison, representing J. H. Pabody, and P. R. Fagan, has applied for a franchise for the construction, operation and maintenance of an electric light plant here.

HAMLIN, W. VA.—Hamlin & Guyandotte River Railway Co. has been incorporated; $50,000; by L. R. Sweetland, L. M. Thacker, John S. Pridemore, A. F. Morris, J. W. Dingess, Huntington, W. Va.; G. E. McComas, Milton, W. Va.

WHEELING, W. VA.—McConnel Box Factory was destroyed by fire; loss, about $12,000.

BARBOURVILLE, KY.—T. W. Minton & Son will build a large woodworking plant.

COVINGTON, KY.—City is having plans prepared for $200,000 improvements on its water system; bids will be taken soon.

FLEMINGSBURG, KY.—Flemingsburg Light & Ice Co. has increased its capital from $8,000 to $12,000, and plans improvements.

HARRODSBURG, KY.—Ice & Produce Co. will increase its plant from 10 to 20 tons; address W. N. Brown Jr.

HENDERSON, KY. — Ohio & Mississippi Valley Barge Co.; capital, $2,000,000; is planning to locate its plant here or at Evansville, Ind., to make steel barges; address Henry F. Allen, Evansville, Ind.

HIGH BRIDGE, KY.—J. D. Hughes Lumber Co. has started work on a $20,000 plant.

LOUISVILLE, KY. — Louisville Chemical Co. is in the market for an electric elevator, a boiler and six steam kettles.

LOUISVILLE, KY.—W. G. Probst is planning a factory for the manufacture of plumbing supplies.

LOUISVILLE, KY.—J. F. Hillerich & Son Co., maker of baseball bats, will install an automatic sprinkler system; address F. W. Brady.

LOUISVILLE, KY.—Kentucky Paint Mfg. Co. was damaged by fire; machinery burned included a 10-horsepower motor, paint mill and mixers.

LOUISVILLE, KY. — Louisville Soap Co. will build a $50,000 addition to its plant; two 300-horsepower water tube boilers will be purchased, besides special equipment; Fred Erhart, architect.

LOUISVILLE, KY.—Axton-Fisher Tobacco Co. is in the market for two 100-horsepower boilers, engine, generator and motors for its new factory; the motors to be from 5 to 20-horsepower.

LOUISVILLE, KY.—Frederick L. Ray, superintendent of motive power of the Louisville Railway Co., has invented a continuous feed water regulator, and has organized the Ray Mfg. Co.; capital, $20,000; to market it; regulator will be made by contract at first and later a factory will be established.

OLIVE HILL, KY.—J. A. Maddox, who was recently awarded an electric light franchise, plans to start work on a plant at once; estimated cost, $10,000.

PADUCAH, KY.—Shepard & Dougherty, St. Paul, will begin work on the Paducah & Illinois railway, to extend from Paducah to the Burlington bridge, being built across the Ohio river, in about two weeks.

WHITESBURG, KY.—Plans are being made for the organization of a local company for the establishment of an electric light system; address Commercial Club.

WINCHESTER, KY. — St. George Hotel lost two gas engines and two dynamos in a fire which caused a loss of $7,500; new equipment will be bought.

BERNE, IND.—Berne Electric Light Co. has increased its capital $24,000.

BLOOMFIELD, IND.—C. H. Jennings, county auditor, will receive bids until 2 p. m., Sept. 8, for a bridge in Smith township.

EVANSVILLE, IND. — Directors of the Evansville & New Harmony Traction Co. say that the business men of Cynthiana, Ind., have agreed to take $100,000 in stock and that the line will pass through that town; construction will start this fall.

FORT WAYNE, IND.—Paul Mfg. Co., maker of pulleys and kitchen cabinets, was wrecked by fire; loss, $60,000; plant will be rebuilt immediately.

INDIANAPOLIS. — Skillman Electric Co. has been incorporated; $10,000; by G. L. Skillman, C. V. Higgins, E. W. Skillman.

INDIANAPOLIS.—Modern Electric & Machine Co. has ben incorporated; $5,000; by Louie H. Knue, H. W. Ransdall, Theodore A. Meyer.

INDIANAPOLIS, IND. — National Motor Vehicle Co. has purchased six lots in Yandes street for a new plant; work to begin in September.

INDIANAPOLIS, IND. — Community Ice Co.; capital, $125,000; will erect a 40-ton plant on the south side and a 60-ton plant on the north side; Carl D. Spencer, president.

LAFAYETTE, IND.—Frigifax Mfg. Co. has

been incorporated, $50,000; by J. E. Chamberlain, W. A. Klepper, E. W. Luckott.

VINCENNES, IND.—County commissioners will receive bids Sept. 8 for several bridge improvements, including four bridges.

CHICAGO.—Western Paper Co. will erect a 2-story, brick factory.

CHICAGO.—Findeisen & Kropp Mfg. Co., Twenty-first and Rockwell street, has a permit for a $5,000, 1-story, brick foundry.

CHICAGO.—The Safety Feeder Co. has been organized to manufacture and sell safety feeders; $50,000; Jos. Mahone, Thomas Kane, Walker F. Butler, 2133 S. St. Louis avenue.

CHICAGO.—Excelsior Cornice Co. has been organized to manufacture ornamental sheet metal work; $25,000; by J. Arthur Johnson, James T. Fales and Luther D. Swanstrom, 69 West Washington street.

CHICAGO.—Paul Gehrhardt, 64 West Randolph street, is preparing plans for a brick and steel family hotel, 10 stories, 200 x 280 feet, containing 700 rooms, to cost $1,500,000. This is to be erected near Lincoln Park.

CHICAGO.—Heath Research Laboratory & Institute, general manufacturing, has been incorporated; $100,000; by David Cleak, Fred B. Fellows, Charles S. Keyes; address F. Alberts, care of the Wellington, Chicago.

CHICAGO.—Auto Pump & Machinery Mfg. Co. has been incorporated to manufacture agricultural implements and pumps; $50,000; by Robert W. Schweichler, John W. Kaufman and S. C. Brynelsen, 2223 N. Kildare avenue.

CHICAGO.—J. W. Snyder, 112 South Michigan avenue, has the general contract for a hotel, to cost $175,000, five stories and basement 125 x 125 feet, of brick and reinforced concrete.

CHICAGO.—Modern Auto Parts Co. has been incorporated to manufacture automobile parts, gasoline engines, and parts; $20,000; by W. R. Fetzer, E. A. Biggs and E. S. Carr, 69 West Washington street.

CHICAGO.—Work on the new $50,000,000 Union station is expected to be started by Sept. 25. Upwards of 10,000 men will be employed continuously for five years. The first work will be grading and laying of new steel rails.

DANVILLE, ILL. — Danville Refractories Co., maker of refractory brick, will erect a $100,000 plant in Tilton shortly; address C. J. Crawford, St. Louis.

DECATUR, ILL.—Rotary Hay Press Co. has been incorporated; $100,000; by Jolly James, Charles F. Cooper, J. W. Jolly.

DE KALB, ILL.—Superior Wire Products Co., general manufacturing, has been incorporated; $15,000; by Charles E. Williams, Arthur S. Bean, Gilbert N. Blackman.

GALESBURG, ILL. — Galesburg Writing Machine Co. has increased its capital from $100,000 to $150,000.

PAXTON, ILL.—E. M. Kramer Co., maker of machinery of all kinds, has been incorporated; $75,000; by Emil M. Kramer, Benjamin R. Yerglar, Harry P. Larsen.

PEORIA, ILL. — King Light Co. was wrecked by fire; loss $35,000; insurance, $30,000.

QUINCY, ILL.—Modern Iron Works is planning to erect a plant at Fifth and Ohio street.

STREATOR, ILL.—Rudolph Shoe Machinery Co. has been incorporated; $25,000; by Carlos Ames, R. H. Rudolph, W. C. Jones.

VANDALIA, ILL.—People's Home Telephone Co. has been incorporated; $22,700; by John U. Metzger, C. F. Easterday, J. H. Boyd Jr.

BAY CITY, MICH.—J. J. Thorne, of this city, has purchased the Pinconning Light & Power Co., consisting of an electric lighting plant, street wiring, etc., in Pinconning, Mich.; a new steam plant and other improvements will be made immediately and the service put on a meter basis; a contract with the town for public lighting is pending.

DETROIT.—Wolverine Automatic Machine Co. has been incorporated; $10,000; by Louis E. Vanhoffman, Charles H. Smith, Leonard G. Weeks.

FLINT, MICH.—Flint Varnish Works have taken out a permit for a $6,000 factory.

MANISTIQUE, MICH.—Schoolcraft Power Co. has been incorporated; $5,000; for the development of water power along the Manistique river.

BELOIT, WIS.—Chicago, Milwaukee & St. Paul is making preliminary surveys for a roundhouse here.

CHETEK, WIS.—Agitation has been revived here for a $30,000 steel highway bridge, to supplant the present Long bridge; council is favorable to the proposition if state aid can be obtained.

MARSHFIELD, WIS. — William Koehler, who is building a large garage, has formed a partnership with Frank Zetter to be known as the Independent Garage Co.; equipment will be installed to do a general machine shop business.

MILWAUKEE. — Northwestern Bridge & Iron Co. has increased its capital from $5,000 to $25,000.

MILWAUKEE.—John Deere Plow Co. was damaged by fire; loss, about $25,000; a number of gasoline engines and other machinery was destroyed.

MILWAUKEE.—Raulf Co. has the general contract for the erection of the Franzen Investment Co.'s $100,000 steel, brick and reinforced concrete building for light manufacturing and salesroom purposes.

MILWAUKEE.—Badger Railway & Light Co., organized to build an electric road from Lake Geneva to Whitewater and later to Fort Atkinson, Jefferson and Watertown, Wis., has disposed of its first issue of $75,000 bonds and is now preparing for actual construction.

MONTELLO, WIS. — Montello & Harrisville Electric Light & Power Co.; capital, $40,000; will build a power plant here and transmission lines to Harrisville and nearby villages; D. W. McNamara, president.

SHEBOYGAN, WIS.—Cigar Box Lumber Co. will erect a 2 and 3-story, 60 x 140-foot planing and box-board mill, of brick and mill construction; O. F. Ringer, architects, Milwaukee.

SUN PRAIRIE, WIS. — Continental Fire Alarm Co., recently organized at Madison, Wis., is negotiating with local capital for the establishment of a plant.

CARTHAGE, MO.—Kaut-Reith Shoe Co. has purchased a site in Carthage for a $30,000, 1 and 2-story, 100 x 270-foot, steel, brick and stone factory; A. J. Prather, architect.

JOPLIN, MO.—Plumbers' Supply Co. has increased its capital from $20,000 to $40,000.

KANSAS CITY, MO.—Oxygen Gas Co. has increased its capital from $10,000 to $20,000.

ST. LOUIS, MO.—American Tar Products Co. has obtained a permit to erect nine steel tanks, to cost $16,708, in Taft avenue.

ST. JOSEPH, MO.—St. Joseph Battery Co. has been incorporated; $30,000; by H. D. Brach, G. H. Furbeck, A. C. Owens, A. G. Gilespie, et al.

ST. LOUIS.—St. Louis Electrical Works has been incorporated; $20,000; by Edwin C. Ballman, Kirkwood, Mo.; Stahl A. Whitten, St. Louis county; Emil Doerr, St. Louis county; Albert W. Wehmhier, Joseph C. Lowe.

WARRENSBURG, MO. — Vitt-Mayes Mfg. Co. has been incorporated; $25,000; by H. H. Vitt, F. L. Mayes, S. E. Coleman.

CLINTON, IA.—Tri-State Telephone Co. has been incorporated; $600,000; by A. G. Hawley, et al.

GRINNELL, IA.—D. A. Laros & Sons, makers of carriage tops, will erect a $20,000 factory at once.

MORNING SUN, IA.—City voted Aug. 10 to erect a water works.

MUSCATINE, IA.—An addition is being planned for the Muscatine Lighting Co.'s gas plant.

MINNEAPOLIS. — Minnesota Tank Co., maker of water tanks, was destroyed by fire; loss, $20,000.

MINNEAPOLIS.—Keith & Co., architects, have completed plans for a business building, 10 stories, flatiron shape, to cost $250,000, for Walter Keith of this city.

MINNEAPOLIS.—Barnett & Record Co., 700 Flour Exchange, has the general contract for an elevator for the Pillsbury Flour Mills Co. It is to consist of 80 tanks, 100 feet high and 26 feet diameter.

ST. PAUL.—The C. M. & St. P. Railway, is planning a concrete and steel bridge, 235 feet long over Snelling and Marshall avenues. This is in charge of M. S. Grytbad, Court House, St. Paul.

ST. PAUL.—The Northern Pacific Railway, W. L. Darling, chief engineer, St. Paul, is to erect a 35-stall round house, power house 41 x 106 feet machine shop, 20 x 51 feet, blacksmith shop, 60 x 90 feet and other buildings. Considerable equipment will be needed on the completion of these structures.

SOUTHERN STATES

SUFFOLK, VA.—Virginia Mfg. Co., affiliated with the Farmers' Mfg. Co., of Norfolk; have issued plans for a reinforced concrete plant; the main building will be 70 x 290 feet; in addition there will be 70-square foot extension and an engine room and machine shop.

MARION, N. C.—D. D. Little, Spartanburg, and New York parties, are building a $1,000,000 cotton mill here.

CENTRAL, S. C.—Issaquenna Mills, textiles, etc., has increased its capital from $300,000 to $315,000.

MACON, GA.—Bibb county votes Oct. 7 on $1,000,000 bonds for bridges, etc.; address county commissioners.

BAY MINETTE, ALA. — City will open bids Sept. 30 for an electric light plant; W. D. Stapleton, mayor.

BIRMINGHAM, ALA.—City will vote Sept. 21 on municipal water works bond issue, providing the city engineer's report is favorable.

BIRMINGHAM, ALA. — Spiro & Merrell Heating & Roofing Co. has been incorporated; $7,000; by Leo Merrell, J. M. Merrell, S. Spiro.

BIRMINGHAM, ALA.—Birmingham Excelsior Co. has been incorporated; $10,000; and has purchased an acre and a half at Twenty-seventh street and Fortieth avenue for a plant to make excelsior; H. S. Lourie, president.

HOUSTON, MISS.—H. E. Brannon, chancery clerk, will receive bids until Sept. 7 for nine steel or wooden bridges; 16 to 70-foot spans.

HOUSTON, MISS.—County board of supervisors will receive bids until Sept. 7 for seven steel bridges, 30, 70, 16, 60, 70, 45 feet long, and three steel or wooden bridges, 30, 35 and 50 feet long.

NEW ORLEANS, LA.—Southern Automobile Mfg. & Supply Co. has secured a 10-acre site for its $700,000 plant in Arabi; plans call for seven buildings.

NEW ORLEANS.—Crescent City Machine & Mfg. Co. was damaged by fire; loss, about $8,000 covered by insurance; A. Vizard, president.

EL PASO, TEX.—Acme Sanitary Flooring Co. has been incorporated; $25,000; by S. K. Albright, A. R. Heinsman, T. C. Phillips.

HOUSTON, TEX.—Rotary Ditching Co. has been incorporated; $50,000; by Minor Stewart, F. P. Eastburn, J. C. Calhoun.

ARKADELPHIA, ARK.—Proposed 10-mile line from Mt. Ida to Womble, Ark.; will be started soon; it is reported that Chicago capitalists are backing the project.

CHATTANOOGA, TENN. — Chamber of

Commerce has donated a site in Allen Park for the $1,000,000 by-product coke ovens to be constructed by the Durham Coal & Iron Co.

DAYTON, TENN. — Dayton Ginning Co. has purchased a site for a cotton gin, and will need a 30-horsepower engine and other equipment; Robert L. Godsey, president.

ERWIN, TENN.—Erwin Water Co. will purchase several pumps and will make other improvements; C. H. Jenks, engineer.

GREENEVILLE, TENN. — Merchants Tobacco Co. will purchase equipment for a new factory, which will replace the plant recently burned.

KNOXVILLE, TENN.—City is considering plans to install two 350-horsepower water tube boilers, two vertical triple expansion engines, etc.; address city commissioners.

LOUDON, TENN.—Loudon Hosiery Mills will build an addition; electric power equipment and knitting machinery will be needed; H. L. Huntington, Chattanooga, Tenn., has plans.

NASHVILLE, TENN. — Union Iron Co. has been incorporated; $100,000; by W. T. Archer, J. C. Morrison, Ralph Dority, H. V. Johnston, John G. Cooke.

NASHVILLE, TENN. — Business Men's Association will assist in raising $1,250,000 bonds, to come from this city and county, for the proposed Nashville, Shiloh & Corinth railway.

NASHVILLE, TENN. — Transmission of Power Co., maker of compression pumps operated by motor for autos, mill machinery, etc., has been incorporated; $100,000; by Thomas A. Killman, R. M. Bogle, G. B. Harvard, T. M. Steger, W. L. Danley.

NEWPORT, TENN. — Newport will vote Sept. 12 on $10,000 bonds for improving the water system and building an electric light plant.

TULLAHOMA, TENN.—Lanon Mfg. Co. has increased its capital from $15,000 to $50,000.

MANGUM, OKLA.—City voted Aug. 4 for bonds for an electric light plant.

WESTERN STATES

MEDORA, N. D.—County commissioners will receive bids until Sept. 7 for a bridge over Little Missouri river.

PARKER, S. D.—C. L. Jones, city auditor, will receive bids until 8 p. m., Sept. 4, for improvement of water works system and for an electric light plant; J. F. Druar, consulting engineer, St. Paul, Minn.

ANACONDA, MONT.—Boston & Montana Development Co. has authorized a $3,000,000 bond issue for the construction of the Southern Montana railway; work which was to start Sept. 15 may be delayed as it was to be performed by an English syndicate.

SEARCHLIGHT, MONT.—Place & Donaldson, Fried, Mont., will establish an electric light plant here.

GREEN RIVER, UTAH.—City voted Aug. 1 for $200,000 bonds to construct an electric light plant.

OGDEN, UTAH.—Gillis & Brittain have a permit to build an $85,000 can factory; equipment and machinery will cost about $115,000; E. A. Ballou, construction engineer, expects factory to be completed about Oct. 30.

SALT LAKE CITY.—Godbe Bros., et al., have taken over the Gila Canyon, Copper Co.'s property and plan to erect a large mill to treat copper ores.

SALMON, IDA.—Salmon River Power & Light Co. has been incorporated; $400,000; by C. L. MacKenzie, Colfax, Wash.; H. H. Boomer, Spokane, Wash.; company plans a power plant on the Salmon river and the construction of transmission lines; to consist of two units of 1,500-horsepower each, preliminary contracts will probably be awarded this year.

BUNKER, WASH. — Bunker Shingle Co. was wrecked by fire; loss, $25,000; insurance, $18,000.

CENTRALIA, WASH.—J. F. Loughran of the Bunker Hill Shingle Co. will rebuild the 180,000 capacity shingle mill recently destroyed by fire.

COLUMBUS, WASH.—County is considering a 600-foot steel bridge across the Yellowstone, near Rapids, and a 50-foot steel span across another stream; B. F. Harris, chairman of county commissioners.

ELLENSBURG, WASH.—Town has voted $4,500 bonds for the construction of an auxiliary steam pump for a municipal water system.

SEATTLE, WASH.—W. J. Condlon, of the Loew-Victor Engine Co., Chicago, says that a large assembling plant for the products of this concern, will probably be established here in the near future; gasoline engines constitute the output of this company.

SPOKANE, WASH.—Kootenai Mining & Milling Co. has been incorporated; $1,000,000; by Thomas W. Murray, et al.; Zent, Powell & Redfield, attorneys.

STEILACOOM, WASH.—A $10,000 bond issue for a light and power system will be decided on Aug. 25.

TOPPENISH, WASH. — W. C. Wychoff, city clerk, will receive bids until Sept. 7 for the construction of a 75,000-gallon tank 105 feet above the ground and the laying of 15,000 feet of cast iron water mains; city reserves the right to pay for the work in cash or water bonds.

YELM, WASH.—Witlatch Lumber Co.'s sawmill was destroyed by fire; loss, $25,000; J. C. Startup, et al.; owners.

CARLTON, ORE.—Carlton Lumber Co.'s plant was destroyed by fire; loss, $500,000.

HOOD RIVER, ORE.—Stanley Smith Lumber Co.'s plant near here was wrecked by fire; loss, $120,000.

PORTLAND, ORE. — Oregon Short Line has favorably received the proposition offering a free right of way and a substantial freight bonus as an inducement to build a 60-mile road through the Blue Creek, Pocatello, Curlew, and Bannock valleys to the American Falls; preliminary surveys have been made.

BLAIRSDEN, CAL. — U. S. government plans the construction of a $1,218,800 pulp and paper plant here by private capital.

CALEXICO, CAL.—Calexico Compress Co. has been incorporated; $50,000; and will build a plant immediately.

EUREKA, CAL.—Redwood Paper & Pulp Co. has been incorporated; $500,000; by George Hasman, George P. Brown, Walter C. Ives.

GLENDALE, CAL.—Bond issue for acquiring municipal water works has been approved.

LOS ANGELES, CAL.—Harbor commission will erect a 7-story, 150 x 600-foot concrete warehouse on the inner harbor; estimated cost, $175,000.

LOS ANGELES, CAL.—Pinney & Boyle Mfg. Co. will erect a plant to consist of nine buildings; the largest will be 300 feet square and the smallest 30 x 50 feet.

MADERA, CAL.—City will vote on $100,000 bonds in September for improvements to fire system, water system, city hall and a bridge.

MARYSVILLE, CAL. — Empire foundry building was destroyed by fire; the machine shop was saved.

MARYSVILLE, CAL.—Survey board will receive bids until Sept. 8 for a bridge at D street, over the Luba river; estimated cost $130,000.

OAKLAND, CAL.—Shredded Wheat Biscuit Co., Niagara Falls, N. Y., will erect a $150,000 factory here, four-fifths of the exterior to be of glass; work will be completed by Jan. 1.

New Trade Publications

PIPE FITTINGS.—The National Tube Co., Pittsburgh, is sending out the second edition of an interesting bulletin describing the manufacture and use of iron body brass mounted wedge gate valves. The first edition, issued in March, 1913, was exhausted several months ago. The several parts of the valves, which vary in size from two to 24 inches inclusive, are described and illustrated. Two valuable tables of dimensions are offered.

SAND-HANDLING MACHINERY. — The Standard Sand & Machine Co., Cleveland, in a 24-page catalog illustrates and describes its extensive line of sand mixing and tempering machines, sand screens, pulverizers, dryers, elevators, sand and mold conveyors, and rolling and bonding machines. An installation at the plant of the Ford Motor Car Co., Detroit, which serves a large number of squeezers, is particularly novel and effective. A drag conveyor at the plant of the Buckeye Steel Casting Co., Columbus, also is shown, as well as an installation of a sand mixer of large capacity in the plant of the Nordberg Mfg. Co., Milwaukee.

ELECTRIC HOISTS.—An 8-page bulletin issued by the Pawling & Harnischfeger Co., Milwaukee, entitled "The Application of the Electric Hoist," shows numerous service views of the electric hoist manufactured by this company. These illustrations include the use of this hoist for handling lifting magnets, conveying pipe in pipe foundries, handling plates in steel plants and for service over foundry floors.

BLOWER EQUIPMENT FOR THE FOUNDRY.—In an exceedingly handsome and well-illustrated 24-page booklet issued by the American Blower Co., Detroit, the blower equipment for a modern foundry is discussed in detail. Considerable space is devoted to the consideration of the heating and ventilating of the modern casting shop and the blast supply to the cupola also is given considerable attention. Blower equipment for foundry exhaust systems is referred to briefly, as well as ventilating apparatus and mechanical draft apparatus for steam boilers.

CRANES.—An exceedingly comprehensive and well-illustrated catalog devoted to its extensive line of cranes has been issued by the Whiting Foundry Equipment Co., Harvey, Ill. This catalog, No. 110, supersedes catalog No. 82. The views of actual installations included represent the wide field of service of the varied line of cranes built by this company. The electric traveling cranes are built in various types, including the three-motor with one main hoist, four-motor with main and auxiliary hoists, double trolley with duplicate two-motor trolleys, double trolley with main and auxiliary trolleys and double trolley with two main trolleys, one having an auxiliary hoist.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery Through Third Quarter.)

Bessemer, valley	$14.00
Bessemer, Pittsburgh	14.90
Basic, Pittsburgh	13.90
Basic, eastern Pa.	14.00 to 14.25
Malleable, Pittsburgh	13.90 to 14.40
Malleable, Chicago	14.00
Malleable, Philadelphia	16.00 to 16.50
Malleable, Buffalo	13.00 to 14.00
No. 1X Philadelphia	15.00 to 15.25
No. 2 foundry, Pittsburgh	13.90 to 14.40
No. 2 foundry, Cleveland	13.75 to 14.25
No. 2 foundry, Ironton	13.50
No. 2 foundry, Chicago	14.00
No. 2X foundry, Philadelphia	14.75 to 15.00
No. 2X fdry., (N. J. tidewater)	14.25 to 14.75
No. 2X foundry, Buffalo	13.00 to 14.00
No. 2 plain, Philadelphia	14.50 to 14.75
No. 2 plain, (N. J. tidewater)	14.00 to 14.25
No. 2 plain, Buffalo	12.75 to 13.75
No. 2 southern, Birmingham	10.00 to 10.50
No. 2 southern, Cincinnati	13.25 to 13.75
No. 2 southern, Chicago	14.85 to 15.85
No. 2 southern, Philadelphia	15.00 to 15.25
No. 2 southern, Cleveland	14.35 to 14.85
No. 2 southern, New York	14.75 to 15.00
No. 2 southern, St. Louis	14.00 to 14.25
Virginia 2X, Philadelphia	15.30 to 15.55
Virginia, 2X, Jersey City	15.30 to 15.75
Virginia, 2X, New Eng., all rail	15.75 to 16.25
Gray forge (eastern Pa.)	13.75
Gray forge, Pittsburgh	13.65
Gray forge, Birmingham	9.00 to 9.50
Silveries, 8 per cent, Cleveland.	17.55
Silveries, 5 per cent, Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phila.	21.50
Lebanon low phos., furnace	17.00 to 17.50
Low phos., Pittsburgh	21.15 to 21.40
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 16.75
Charcoal, Birmingham	25.00
Middlesbrough, No. 3, Phila., ex-ship	15.00 to 15.25

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent.	$3.75
Mesabi Bessemer, 55 per cent.	3.50
Old range, non-Bess., 51½ per cent.	3.00
Mesabi, non-Bessemer, 51½ per cent.	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent.	7c
Foreign non-Bess., 50 to 65 per cent.	7c

COKE

(At the ovens.)

Connellsville furnace	$1.75
Connellsville fur. contr.	1.75 to 1.85
Connellsville foundry	2.25 to 2.50
Connellsville fdy., contr.	2.35 to 2.50
Wise county furnace	1.85 to 2.10
Wise county foundry	2.25 to 2.75
Pocahontas furnace	1.80 to 2.05
Pocahontas foundry	2.25 to 2.40
New River, foundry	2.75 to 3.50
New River, furnace	2.20 to 2.35

FERRO-ALLOYS

Ferro-manganese, Baltimore	$100 to 125
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Billets, Pbgh.	$21.00
Billets, Youngstown	20.00
Open-hearth bil., Phila.	22.40 to 23.40
Sheet bars, Pittsburgh	22.00
Sheet bars, Youngstown	21.00
Op-h'th sh. bars, Pbgh. and Yn.	21.00
Forging billets, Phila.	25.40 to 26.40
Forging billets, Pittsburgh	25.00
Wire rods, Pittsburgh	24.50 to 25.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh., base	1.50c
Angle bars, st. sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.40c to 1.45c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh.	2.00c
Track bolts, Chgo.	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.20c
Structural shapes, Chicago	1.38c
Structural shapes, Philadelphia	1.30c to 1.35c
Structural shapes, New York	1.31c to 1.36c
Structural shapes, San Francisco.	2.00c to 2.05c
Tank plates, Chicago	1.38c

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Baltimore	14½ cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Minneapolis and St. Paul	32 cents
Denver	67½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	46 cents

Tank plates, Pittsburgh	1.20c
Tank plates, Philadelphia	1.30c to 1.35c
Tank plates, New York	1.31c to 1.36c
Bars, soft steel, Pittsburgh	1.20c
Bars, soft steel, Chicago	1.38c
Bars, soft steel, Philadelphia	1.35c
Bars, soft steel, New York	1.36c
Hoops, carloads, Pittsburgh	1.25c to 1.30c
Hoops, less carloads, Pittsburgh	1.30c to 1.35c
Bands, Pittsburgh	1.20c
Shafting, carloads, Pbgh., disc. contract	65 to 66 off
Shaft'g less carl'ds, Pbgh., disc.	63
Bar iron, Chicago	1.07½c to 1.12½c
Bar iron, Philadelphia	1.15c to 1.20c
Bar iron, New York	1.20c to 1.30c
Bar iron, Cleveland	1.20c
Bar iron, Pittsburgh	1.20c to 1.25c
Hard steel bars, Chicago	1.25c to 1.30c
Smooth finish'g mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.95c to 2.00c
No. 28, black, Chicago	2.18c
No. 28, tin mill, black, Pbgh.	1.95c
No. 28, galvanized, Pbgh.	2.95c to 3.00c
No. 28, galvanized, Chgo.	3.18c
No. 10, blue, annealed, Pbgh.	1.40c to 1.45c
No. 10, blue, annealed Phila.	1.50c
Tin plate, 100 lb., coke, base	$3.60 to 3.75

IRON AND STEEL PIPE

(Pittsburgh.)

	Black	Galv. Butt-weld.
Steel, ¼ to 3 inches	80	71½
Iron, ¼ to 2½ inches	70	61
	Lap-weld.	
Steel, 2½ to 6 inches	79	70½

Steel, 3½ to 4½ inches	73
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.55 to 1.60
Wire nails, retailers, Pittsburgh	1.60 to 1.65
Plain wire, jobbers, Pittsburgh	1.35 to 1.40
Plain wire, retailers, Pittsburgh	1.40 to 1.45
Galvanized wire, jobbers, Pbgh.	1.75 to 1.80
Galvanized wire, retailers, Pbgh.	1.80 to 1.85
Polished staples, Pbgh.	1.55 to 1.60
Galvanized staples, Pbgh.	1.95 to 2.00
Barb wire, painted, jobbers, Pbgh.	1.55 to 1.60
Barb wire, painted, retail'rs, Pbgh.	1.60 to 1.65
Barb wire, galv., retail's, Pbgh.	2.00 to 2.05
Barb wire, galv., jobbers, Pbgh.	1.95 to 2.00

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, 3/8 x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads, 80 and 15; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts 3/8 x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 80 and 25.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, c. and t. square, blank or tapped, $6 off; hexagon, blank or tapped, ½ inch and larger, $7.20; 9/16-inch and smaller, $7.80.

RIVETS

Structural rivets, Pbgh.	1.50c to 1.60c
Structural rivets, Chgo.	1.68c
Boiler rivets, Pbgh.	1.60c to 1.70c
Boiler rivets, Chgo.	1.78c

SCREWS

(New York.)

Lag, gimlet and cone point.	80 and 20
Coach, gimlet point	80
Standard Jack	70 and 10
Mch., cut thread, flat head.	50 and 10
Mach., cut thread, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and40 and 10
Mch., rolled thread, flat head or round head	80 and 10
Set screws, iron	75 and 10 and 10
Set screws, steel, per cent advance over iron	25
Square head cap screws	70 and 10 and 10
Hexagon head cap screws	70 and 10 and 10
Fillister head cap screws	60 and 10 and 10
Flat head wood screws	10 and 10 and 5
Round head wood screws	10 and 10 and 5

CAR WHEELS

33-inch Engine truck wheels	$22.00 to $24.00
36-inch engine truck wheels	23.00 to 25.00
33-inch tender wheels	18.00 to 18.50
36-inch passenger train car and tender wheels	20.00 to 20.50
33-inch freight car wheels	15.50 to 16.00

All f. o. b. Pittsburgh.

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

¾-inch and larger	1.20c to 1.25c
⅝-inch	1.25c to 1.30c
½-inch	1.30c to 1.35c
⅜-inch	1.45c to 1.50c
¼-inch	1.70c to 1.75c

IRON AND STEEL PRICES

Corrected up to Tuesday noon

TACKS

(New York.)—

	Discount.
American carpet tacks	90 and 20 and 10 and 10
American cut tacks	90 and 20 and 10 and 10
Railroad tacks	90 and 50 and 10
Gimp tacks	90 and 20 and 10 and 10
Finishing nails	70

WIRE ROPE

Galvanized, iron and steel	47½ and 2½
Bright, Iron and steel	55 and 2½

TRIANGLE REINFORCING MESH

(Per 100 square feet f. o. b. mill, car loads.)

No. 4, plain	$1.00
No. 4, galvanized	1.12
No. 7, plain	.49
No. 7, galvanized	.55
No. 23, plain	1.69
No. 23, galvanized	1.88
No. 26, plain	1.17
No. 26, galvanized	1.30
No. 27, plain	.96
No. 27, galvanized	1.07
No. 31, plain	2.49
No. 31, galvanized	2.76
No. 35 plain	1.17
No. 35, galvanized	1.30
No. 39, plain	3.05
No. 39 galvanized	3.38
No. 43, plain	1.10
No. 43, galvanized	1.23

SPIRAL RIVETED PIPE

(Per 100 linear feet, f. o. b. factory.)

4-inch, plain	$ 19.76
4-inch, galvanized	30.74
6-inch, plain	33.05
6-inch, galvanized	49.73
8-inch, plain	43.17
8-inch galvanized	65.00
10-inch, plain	66.42
10-inch, galvanized	96.15
12-inch, plain	83.75
12-inch galvanized	118.30
14-inch, plain	99.14
14-inch, galvanized	138.85
16-inch, plain	117.53
16-inch, galvanized	166.58
20-inch, plain	183.79
20-inch, galvanized	248.39
24-inch, plain	219.92
24-inch, galvanized	293.99
30-inch, plain	324.81
30-inch, galvanized	430.64

CAST IRON PIPE

Three to 24 in., Cleveland	$ 22.35 to 22.80
Four-inch, water, Chicago	26.50
Six to 12 inches, Chicago	24.50
Larger sizes, Chicago	24.00
Six-inch, water, New York	20.50 to 21.50
Four-inch, water, Birmingham	19.50
Six-inch and larger, Birmingham	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.70c to 1.85c
Steel bars, Philadelphia	1.75c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.65c to 1.75c
Iron bars, Philadelphia	1.70c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.80c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.75c
Shapes and plates, New York	1.85c
No. 10 blue ann. sheets, Chgo.	1.95c
No. 10 blue ann. sheets, Cleve.	2.15c
No. 10 blue ann. sh., St. Louis	1.90c to 2.00c
No. 10 blue ann. sheets, Cinci.	1.95c
No. 28 black sheets, Chgo.	2.55c
No. 28 black sheets, Cleveland	2.60c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sh., St. Louis	2.45c to 2.55c
No. 28 galv. sheets, Chgo.	3.55c
No. 28 galv. sheets, Cleveland	3.60c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c
No. 28 galv. sheets, St. Louis	3.35c to 3.55c

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo.	$ 8.50 to 8.75
No. 1 railroad wrought, Cleve.	9.50 to 10.00
No. 1 railroad wrought, St. L.	7.75 to 8.00
No. 1 railroad wrought, Cinci.	8.00 to 8.50
No. 2 railroad wrought, Chgo.	8.00 to 8.25
No. 2 railroad wrought, St. L.	7.50 to 7.75
Arch bars and transoms, Chgo.	11.50 to 12.00
Arch bars and transoms, St. L.	11.00 to 11.50
Knuckles, coup. and spr'gs, Chgo.	9.00 to 9.50
Knuckles, coup. & spr'gs, St. L.	9.25 to 9.50

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	13.00 to 13.50
Steel car axles, Chgo.	11.50 to 12.00
Steel car axles, St. Louis	11.75 to 12.25
Locomotive tires, Chicago	9.00 to 9.50
Locomotive tires, St. Louis	8.75 to 9.25
Cut forge, Chicago	8.00 to 8.25
Pipes and flues, Chicago	6.50 to 6.75
Pipes and flues, Cleveland	7.75 to 8.25
Pipes and flues, St. Louis	5.75 to 6.25
No. 1 cast, Chicago	9.25 to 9.75
No. 1 cast, Cleveland	10.00 to 10.50
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	9.50 to 10.00
No. 1 busheling, Chicago	7.25 to 7.50
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	5.75 to 6.25
No. 1 busheling, St. Louis	7.25 to 7.50
No. 2 busheling, Chicago	5.75 to 6.00
No. 1 boiler plate, cut, Chgo.	6.25 to 6.75
No. 1 boiler plate, cut, Buffalo	9.00 to 9.50
No. 1 boiler plate, cut, St. L.	6.00 to 6.50
Boiler punchings, Chicago	8.50 to 9.00
Cast borings, Chicago	4.50 to 5.00
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	4.00 to 4.50
Machine shop turnings, Chgo.	5.00 to 5.25
Machine shop turnings, Cleve.	5.00 to 5.25
Machine shop turnings, Cinci.	4.25 to 4.75
Machine shop turnings, St. L.	4.50 to 5.00
Malleable, agl., Chicago	7.75 to 8.25
Malleable, agricultural, St. Louis	7.50 to 8.00
Malleable, railroad, Chicago	8.25 to 8.50
Malleable, railroad, Cincinnati	6.50 to 7.00
Malleable, railroad, St. Louis	7.50 to 8.00
Angle bars, iron, Chgo.	11.50 to 12.00
Angle bars, Iron, St. Louis	10.00 to 10.50
Angle bars, steel, Chgo.	8.25 to 8.75
Angle bars, steel, St. Louis	9.25 to 9.50
Stove plate, Chicago	8.50 to 8.75
Stove plate, Cleveland	7.75 to 8.00
Stove plate, Buffalo	9.75 to 10.00
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	8.25 to 8.75
Bundled sheet, Cincinnati	4.00 to 4.50
Wrought iron pil'g plates, Clev.	13.00

(Gross Tons.)

Heavy melting steel, Pbgh.	$11.50 to 11.75
Heavy melting steel, Buffalo	10.00 to 10.50
Heavy melting steel, Chicago	9.50 to 9.75
Heavy melting steel, Cleveland	10.00 to 10.50
Heavy melting steel, Cincinnati	9.00 to 9.50
H'vy melting steel, eastern Pa.	10.50 to 11.00
Heavy melting steel, New York	8.25 to 8.50
Heavy melting steel, St. Louis	11.00 to 11.50
Bundled sheet, Buffalo	5.25 to 6.50
Grate bars, Buffalo	9.50 to 10.00
Grate bars, New York	5.25 to 5.50
No. 1 railroad wr'ght east. Pa.	12.00 to 12.50
No. 1 railroad wrought, Pbgh.	11.50 to 11.75
No. 1 R. R. wght., New York	10.25 to 10.50
No. 1 R. R. wrought, Buffalo	11.00 to 11.50
Shafting, New York	11.00 to 11.50
Pipes and flues, New York	7.00 to 7.25
Pipes and flues, eastern Pa.	10.00 to 10.50
Mch. shop turnings, New York	5.75 to 6.00
Machine shop turnings, Buffalo	5.50 to 6.00
Mch. shop turnings, Pbgh.	7.75 to 8.00
Mch. shop turnings, eastern Pa.	8.00 to 8.50
Cast borings, New York	5.50 to 5.75
Cast borings, eastern Pa.	8.50 to 9.00
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.50
Stove plate, (Jersey points)	8.00 to 8.25
Stove plate, Pittsburgh	8.75 to 9.00
Stove plate, eastern Pa.	8.50 to 9.00
Shoveling steel, Chicago	8.75 to 9.00
Shoveling steel, St. Louis	8.00 to 8.25
Reroll'g rails, 5 ft. & ov., Pbgh.	13.00
Reroll. rails, 5 ft. & ov., Chgo.	11.25 to 11.50
Reroll. rails, 5 ft. & ov., Cleve.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	12.00 to 12.50
Reroll. rails, 5 ft. & ov., St. L.	11.25 to 11.50
Steel rails, short, Chicago	10.00 to 10.25
Steel rails, short, Cleveland	12.50 to 13.00
Steel rails, short, St. Louis	10.50 to 10.75
Iron rails, Cleveland nom.	13.25 to 13.75
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa.	14.00 to 15.00
Iron rails, St. Louis	11.00 to 11.25
Iron rails, Pittsburgh	13.00 to 13.50
Frogs, switches, guards, Chgo.	9.50 to 9.75
Frogs, switches & g'rds. St. L.	10.50 to 10.75
Car wheels, (iron), Pittsburgh	11.25 to 11.50
Car wheels, (steel), Pittsburgh	12.75 to 13.00
Car wheels, Chicago	10.75 to 11.00
Car wheels, eastern Pa.	11.00 to 11.50
Car wheels, Buffalo	12.00 to 12.50
Car wheels (N. J. points)	10.50 to 11.00
Car wheels, St. Louis	11.00 to 11.25
Iron axles, Pittsburgh	19.00 to 20.00
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	20.00 to 21.00
Iron axles, Buffalo	21.50 to 22.00
Iron axles, Chicago	18.25 to 18.50
Steel car axles, New York	12.00 to 12.50
Steel car axles, Buffalo	15.00 to 15.50
Steel car axles, Cleveland	14.00 to 16.00
Steel car axles, eastern Pa.	14.50 to 15.00
No. 1 busheling, Buffalo	8.50 to 9.00
No. 1 busheling, Pittsburgh	9.00 to 9.50
No. 2 busheling, Buffalo	6.00 to 6.50
Low phosphorus steel, Buffalo	15.00 to 15.50
Low phosphorus steel, Pbgh.	14.00 to 14.50
Low phos. steel, eastern Pa.	14.50 to 15.00
No. 1 forge, eastern Pa.	8.00 to 8.50
No. 1 cast, eastern Pa.	12.00 to 12.50
No. 1 cast, Pittsburgh	11.00 to 11.50
No. 1 heavy cast (N. J. points)	11.00 to 11.50
Boiler plate, Cleveland	8.50 to 9.00
Mall. iron, agricul., Cleveland	9.00 to 9.50
Mall. iron R. R., Cleveland	10.25 to 10.75
Malleable, railroad, Pittsburgh	9.50 to 10.00
Mall. R. R., Buffalo	10.75 to 11.25
Mall., R. R. east. Pa.	9.00 to 9.50
Bundled sheet, Pittsburgh	8.50 to 8.75
Bundled sheet, Cleveland	7.50 to 8.00

MISCELLANEOUS SHOP TOOLS

	Discount.
Standard files	80 and 5
Heavy hammers, 3 to 5 lb.	80 and 10
Heavy hammers, over 5 lb.	80 and 5
Gas pliers, 7-inch, per dozen	$2.00
Gas pliers, 12-inch, per dozen	3.50
Cold chisels, per pound	10c to 15c
Wrenches, aligator, discount	75 to 80
Wrenches, drop forged S.	60

High-Grade Tin and Terne Plates
Genuine Charcoal and Iron Terne Plates

The Carnahan Tin Plate & Sheet Company

Canton, Ohio

Specialties → Blued and Polished Steel, Deep Drawing Steel, Automobile Sheets, Full Finished Enameling and Ceiling Stock, Etc.

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CLEAN, SOUND AND TRUE TO PATTERN
IN LOW AND MEDIUM CARBON AND MANGANESE STEEL
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Chilled Iron Castings Rolling Mill Parts
Heavy and light weight castings.
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SOLID BELT DRESSING
Send for "The Proper Care of Belts," No. 64
Made in JERSEY CITY, N. J. by the
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WHEELING, WEST VIRGINIA
ROLLS Chilled, Sand and Steel
Acid Open Hearth STEEL CASTINGS
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Tin Plates, Black Plates, Terne Plates
ALL GRADES, COATINGS, AND FINISHES
Our recent increased capacity for Common Terne and Black Plates Solicits further patronage
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PRIME WESTERN SPELTER
Used exclusively on all Angles, Bars, Bands, Beams, Channels, Hoops, Plates, Tees, Spikes, etc.
McCANCE BROTHERS COMPANY
VERONA, PENNSYLVANIA

Making Steel Castings-III

(*Continued from page* 380.)

admirably adapted for extremely thin sections, by nicety of heat control and confined melting surface. The cause for lack of uniformity in gas-welding may lie in the difficulty of maintaining desired percentages of the different gases where they ignite.

The extent to which welding may be properly employed should be judiciously determined by the purpose to be served by the casting and the extent and location of the defect. Honest manufacturers will take no greater chances than will reasonable, intelligent consumers. There are many castings that undergo severe usage, in certain members of which there is such a high safety-factor that welds therein may be approved at a glance as the repairing of surface defects.

The gas torch, unlike the arc, is occasionally used with great mechanical success in burning off gates and risers too heavy to remove by chippers, and so displaces the cold saw. The path cut by some gas torches is in truth a "straight and narrow way" impossible of attainment with an electrode.

The selection of a gas or arc-welding outfit should be governed not only by the class of work to be repaired, but the availability and cost of current and gas. Particular investigation should be made regarding the reliability of the control apparatus for a motor-generator set, and concerning the safe construction and operation of an acetylene generator for a gas welding outfit. Fatalities have occurred in their use. Electric welders are in no danger, due to the low voltage required, but the skin and particularly the eyes of those men must be amply protected against the painful, though temporary effect of the intense light. Gas-operators can better perform their work with colored goggles, though these are not required for protection.

Testing

The variety of tests made to determine the quality of steel castings, which are very often sold on specifications and passed upon by the customers' inspectors at the foundry, seems by its importance and distinguishing features to deserve a brief topical discussion before concluding. These tests demand chemical laboratory determinations for carbon, phosphorus, sulphur, manganese and silicon in every heat and occasionally percentages of nitrogen and other elements are ascertained. Laboratory determinations must of course, include analysis for chrome, nickel and other special elements entering into alloy steels. Steel works laboratories are characterized by the quick methods evolved, for time is an essential element. Many steel foundries make only one complete final analysis for each heat in addition to the preliminary analyses before tapping, and the customary analyses for every carload of pig iron and ferro-alloys received (which are purchased on specifications), and periodic analyses for other materials charged. Acid shops must determine the impurities in steel scrap, and basic plants give proper attention to quality of lime-rock. In some steel foundries several complete analyses are made for each heat poured. These afford an interesting study of ladle reactions, and basic plants establish definitely the quality of the castings poured last.

Surface inspection for observable defects offers no contrast in the cleaning room of the steel foundry to that customary in iron shops, beyond the closer scrutiny required by the heavier demands to be made upon the casting and the faculty possessed by shrinkage cracks in steel to hide themselves from casual observation.

Hydraulic presses employed for straightening warped or bent steel castings afford convenient means for periodic transverse tests for deflection and permanent set of entire castings. Drop tests for shock resistance are regularly applied to certain classes of castings. Most of these shop testing methods

would result in destruction to iron castings.

In the physical laboratory, employed solely, unlike its neighbor, the chemical laboratory, for after-determination, there are sometimes found impact or fatigue testing machines and apparatus for miscroscopical tests. The former are not in common use, and opinions differ as to their supplementary value in testing ordinary steel. The microscope and camera are frequently found in large plants which practice annealing, and afford the most reliable means of determining effect of heat-treatment. They are also useful in studying the purity of the steel. The existence of certain harmful inclusions in steel cannot be ascertained by any other means. Hardness testing machines are used in foundries making steel to withstand severe abrasion.

In all large and in many medium-sized steel foundries employing scientific methods is found the tensile machine, providing the standard means for conducting physical tests on steel. This machine needs no explanation because of its familiarity. Many concerns determine the yield point, tensile strength, percentage of elongation and percentage of reduction in a sample from each heat of steel. A word with reference to these test bars is *apropos*. The writer found that round test pieces of low carbon steel, cast vertically, suffer by segregation, a loss of approximately 12 per cent in elastic limit and tensile strength, and 66 per cent in elongation and reduction as compared with bars cast horizontally beneath heavy feeding blocks. The skins of the vertically poured bars contained about three-fourths as much carbon and twice as much sulphur as did the cores of the same specimens. It is apparent that the conditions surrounding the making of test pieces must be understood before an index to quality of steel may be obtained when it is borne in mind that the above comparisons were made on horizontal and vertical bars teemed successively from the same heats.

Conclusion

It may be seen that the manufacture of steel castings offers a tremendous field for ingenuity and research, and necessitates efficient organization and unceasing care for routine details. The variety of skilled trades represented in a large steel foundry, the manner in which the different operations inter-mesh and the multitude of things that may "go wrong" make the proposition as a whole complex in the extreme, and very costly as compared with iron foundry or steel mill operations. In this connection, the fact that in open-hearth foundries a yield of 60 to 65 per cent of good castings per ton of metal charged rewards good practice, is pertinent. Sir Robert Hadfield has said: "There is no royal or rapid road to the production of sound steel castings. This is only attained by long experience combined with specialized knowledge." It follows that the work is of absorbing interest, never palling on the manager or superintendent by monotony. It would be unfortunate for the ultimate, if yet far distant perfection of the art, were the tribulations of the steel founder not varied enough to excite his continual keen interest rather than his aversion.

The Vulcan Process Co., Minneapolis, Minn., and Cincinnati, O., has published a book of instructions on the welding and cutting of metals by the oxy-acetylene process. This book, which is durably bound in cloth, contains 86 pages of practical instructions on welding steel, copper, aluminum and other metals.

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